

# **Finding of No Significant Impact:**

## **Charleston Air Force Base**

### **Fuel Storage Tank Removal and Replacement at Charleston AFB, South Carolina**

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Charleston Air Force Base (Charleston AFB) has prepared an Environmental Assessment (EA) (October 2004) that evaluates the potential environmental and socioeconomic impacts associated with the removal of four fuel tanks, the construction of two new fuel tanks, and the installation of a new fuel delivery pipeline.

### **Description of the Proposed Action**

The Proposed Action would remove three 4,050-barrel (170,000-gallon each) and one 6,050-barrel (254,000-gallon) fuel storage tanks and spill containment and abandon in place an 8-inch fuel transfer line. An existing 54,760-barrel (2,300,000-gallon) tank would remain operational. The storage tanks would be replaced with two 80,000-barrel (3,360,000-gallon each) tanks and the fuel transfer line would be replaced with approximately 5,800 feet of 12-inch line. The fuel transfer line would be rerouted on the western side of Building 675 and then east to connect with the existing fuel distribution system. This would result in a fuel storage facility with a total capacity of 214,760 barrels (9,019,900 gallons) consisting of two 80,000-barrel tanks and one 54,760-barrel tank.

Under the Proposed Action, the new tanks would be located in the same area as the existing fuel storage tanks. The tanks would be approximately 110 feet in diameter and 48 feet in height. The footprint of the fuel storage facility would be expanded to accommodate the increased spill containment requirements. The spill containment area for the existing large tank would be maintained. A new spill containment area would be constructed south and west of the existing large tank and would accommodate 110 percent of the total capacity of the largest tank.

Assuming the spill area is 5 feet deep, then the footprint of the containment area would cover 98,840 square feet.

Installation of the 12-inch fuel transfer line would follow a path that would extend north of several buildings through open space, east toward the ready apron, east under Taxiways D and E, and then south to the fueling facility.

### **No-Action Alternative**

The No-Action Alternative would continue current aircraft fueling operations. The Base would continue to have a limited storage capacity (62,860 barrels static storage). In the past, the facility has provided more than 286,000 barrels of fuel a month. These operational constraints would limit flexibility and create tremendous complexities in the management of incoming supplies.

Under the No-Action Alternative, the 8-inch fuel transfer line would not be replaced. The same fuel delivery capabilities would exist. The 8-inch line would continue to represent a safety issue for the building occupants in the CE complex under which the transfer line extends. If a problem were to occur in the line, the health and well being of the CE complex occupants would

be at risk. Likewise, if the fuel transfer line were in need of maintenance, excavating the line to repair it or remove contaminated soil would be costly and disruptive to ongoing operations of the fuel maintenance facility and the occupied buildings.

## Environmental Consequences

No significant negative environmental or socioeconomic consequences were identified in the EA for the proposed project. During demolition and construction, minor impacts to air quality, noise, soils, and transportation systems would occur, as well as the generation of solid waste. The potential for exposure to contaminated soils and groundwater would also exist. The use of proper health and safety equipment and performance of monitoring during construction and appropriate disposal procedures would prevent impacts. Minor impacts to air quality and the conversion of approximately 0.5 acre of maintained lawn to tanks and concrete would occur following construction. It was determined that the proposed project would generate a short-term positive impact on the local economy and a cumulative long-term benefit to airfield operations and Charleston AFB's expanded mission.

## Conclusion

The attached EA was prepared pursuant to Air Force Instruction (AFI) 32-7061, 32 Code of Federal Regulations (CFR) 989, and U.S. Council on Environmental Quality (CEQ) regulations (Title 40, U.S. Code, Parts 1500-1508) for implementing the procedural requirements of the National Environmental Policy Act (NEPA). The finding of this EA is that the Proposed Action will have no significant impact on the human or natural environment. Therefore, a Finding of No Significant Impact (FONSI) is issued for the Proposed Action and no Environmental Impact Statement (EIS) is required.

SD04  
Signature

30 Nov 04  
Date

SAMUEL D. COX, Colonel, USAF  
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Environmental Protection Committee Chairperson

**Charleston Air Force Base  
Architect-Engineering (A-E) Services  
Final Environmental Assessment for Fuel Storage Tank Removal and  
Replacement  
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Dear Ms. Hood:

Subject: Charleston Air Force Base  
Architect-Engineering (A-E) Services  
*Final Environmental Assessment for Fuel Storage Tank Removal and Replacement*  
CDRL A001C, A001D, and A001J; Paragraph 9.4.1 and 9.4.2  
Project No. AMC204638  
Contract No. F41624-03-D-8595  
Task Order 0202

The purpose of this letter is to submit the *Final Environmental Assessment for Fuel Storage Tank Removal and Replacement* at Charleston Air Force Base. This Environmental Assessment includes a *Description of Proposed Actions and Alternatives* (DOPAA) to support the Environmental Assessment for Fuel Storage Tank Removal and Replacement at Charleston Air Force Base. This transmittal also includes a Finding of No Significant Impact (FONSI).

Copies of this document have been delivered to the individuals listed on the attached distribution. This submittal satisfies the requirement for CDRL A001C, A001D, and A001J; Paragraph 9.4.1 and 9.4.2 for Task Order 0202.

If you have any questions concerning this submittal, I can be reached at 770/604-9182, Extension 504.

Sincerely,

CH2M HILL

Russell Short  
Project Manager

# Architect-Engineering (A-E) Services



## Final Environmental Assessment for Fuel Storage Tank Removal and Replacement

CDRL A001C, A001D, and A001J  
Paragraph 9.4.1 and 9.4.2

Prepared for  
Charleston Air Force Base, South Carolina 29404

Contract No.F41624-03-D-8595  
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# Preface

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CH2M HILL is performing Architect-Engineering (A-E) Services to support Natural Resource Liability Asset Management (NRLAM) Assessment, Environmental Assessments, and Various Conservation Projects at Charleston Air Force Base, South Carolina. This work is being conducted under the Air Force Center for Environmental Excellence Contract No. F41624-03-D-8595, Task Order No. 0202 (Project No. AMC204638 and Project No. AMC208892).

Key CH2M HILL project personnel for *Final Environmental Assessment for Fuel Storage Tank Removal and Replacement* at Charleston Air Force Base completed under this contract are:

- Andrew Chartrand – Regional Project Team Lead
- Tom Simpson – Senior Review
- Russ Short – Task Manager
- Fawn Elhadidi – Document Coordinator
- David Dunagan – Technical Editor

For quality control purposes, CH2M HILL staff have reviewed this Environmental Assessment. The senior reviewer listed below, by virtue of his signature, has concluded that this document meets or exceeds the deliverable requirements set forth in the Statement of Work.



---

Tom Simpson, Ph.D.

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October 14, 2004

Date

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# Acronyms and Abbreviations

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AES	Aeromedical Squadron
AF	Air Force
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
AMC	Air Mobility Command
AOC	Area of Concern
APZ	Accident potential zone
AVGAS	Aircraft Fuel
AW	Airlift Wing
BAQ	Bureau of Air Quality
BASH	Bird Aircraft Strike Hazard
BMP	Best Management Practice
C&D	Construction and Demolition
CAA	Clean Air Act
CE	Civil Engineering
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
CWA	Clean Water Act
CMZA	Coastal Zone Management Act
DHEC	Department of Health and Environmental Control
DRMO	Defense Reutilization Management Office
EA	Environmental Assessment
EIS	Environmental Impact Statement

EO	Executive Order
ESA	Endangered Species Act
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FY	Fiscal Year
HAZMAT	Hazardous Materials
INRMP	Integrated Natural Resources Management Plan
ERP	Environmental Restoration Program
LF	Linear Foot
MAJCOM	Major Command
MOGAS	Automobile Fuel
MSW	Municipal Solid Waste
NAAF	North Auxiliary Air Field
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPS	Non-point Source
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OCRM	Ocean and Coastal Resource Management
OSHA	Occupational Safety and Health Act
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ROTC	Reserve Officers' Training Corps
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SPCC	Spill prevention, control, and countermeasures
SWMU	Solid Waste Management Unit

SWP3	Stormwater pollution prevention plan
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
TSDf	Treatment, Storage, and Disposal Facility
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
U.S. EPA	U.S. Environmental Protection Agency
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound

# Executive Summary

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The United States Air Force (USAF) Air Mobility Command (AMC) proposes to modify a fuel storage facility at Charleston Air Force Base (Charleston AFB) in Charleston County, South Carolina. Charleston AFB is located within the City of North Charleston, 10 miles northwest of the City of Charleston. The AFB and the towns of Charleston and North Charleston lie in the coastal zone of South Carolina between the Ashley and Cooper Rivers.

Currently, the Charleston AFB aircraft fueling facility includes five storage tanks totaling 72,960 barrels (3,064,020 gallons) of storage capacity. The five tanks include three 4,050-barrel (170,000-gallon) tanks, one 6,050-barrel (254,000-gallon) tank, and one 54,760-barrel (2,300,000-gallon) tank. The current configuration has limited storage capacity that leads to inefficient fueling operations during high demand. Throughput can exceed 286,000 barrels of fuel per month. Fuel is transferred through an 8-inch diameter line to the flight line. The existing fuel transfer line passes under the Civil Engineering (CE) compound between the storage tanks and the flight line. The current conditions represent a potential safety issue for the CE complex. The current storage capacity is considered too limited to meet peak demand, as has been evident in the last 2 years, and both the size and location of the fuel transfer line should be changed to increase efficiency and improve safety.

Charleston AFB, with the support of AMC and the Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, has prepared this Environmental Assessment (EA) for the Proposed Action, in accordance with the National Environmental Policy Act (NEPA) implementing regulations, a related Air Force Instruction (AFI 32-7061), Code of Federal Regulations (CFR) (32 CFR 989), and Department of Defense (DoD) directives.

The purpose of this EA is to provide information in support of a decision process to determine which of three alternatives would best meet the purpose and need of the project. The three alternatives are: the No-Action Alternative, the Proposed Action (i.e., the removal of existing tanks, abandonment of transfer line, and replacement with larger tanks at the same site and a rerouted fuel transfer line), and a Third Alternative (i.e., placement of the new tanks at the "Hot Cargo Zone" and installation of fuel transfer and supply lines).

AMC's Proposed Action is to remove four existing fuel storage tanks and construct two 80,000-barrel (3,360,000-gallon) JP-8 fuel tanks, abandon an existing 8-inch fuel delivery pipeline, and install approximately 5,800 feet of new 12-inch fuel delivery pipeline. The line would be installed outside existing building complexes. The tanks targeted for removal are three 4,050-barrel (170,000-gallon) and one 6,050-barrel (254,000-gallon) tanks. The 54,760-barrel tank would remain operational. The location for the Proposed Action would be the same as the existing fuel storage facility. The new storage capacity would be 214,760 barrels (9,019,900 gallons).

The No-Action Alternative would maintain existing operations.

The Third Alternative would remove the same 4 fuel storage tanks as the Proposed Action. The existing 8-inch diameter fuel delivery pipeline would be abandoned in place. The two 80,000 barrel tanks would be constructed near the Hot Cargo Zone at the southern end of Runway 3. Installation of approximately 5,800 feet of fuel supply line would be required to convey fuel to the new storage area. The Third Alternative would also require installation of approximately 5,500 feet of 12-inch fuel delivery line to transfer fuel to the plane fueling station.

The objectives of the Proposed Action are to:

- Increase fuel storage capacity
- Improve fuel quality by upgrading storage and handling capabilities
- Improve safety of the existing fuel transfer operations
- Decrease the time required for refueling

The No-Action Alternative would not meet any of the objectives defined above and is not considered a viable option.

The Third Alternative would meet three of the four objectives above. It would not meet the safety objective since the site is located in the Hot Cargo Zone and represents an increased explosive potential. In addition, the Third Alternative would require substantial cost for installation of pipelines, a fuel supply line to the fuel storage facility, and a fuel delivery line to the plane fueling area.

The Proposed Action would meet all of the objectives.

The Proposed Action and the Third Alternative would have similar impacts on the environment. None of the impacts would be significant. No impacts to wetlands or floodplains would occur with either of these two alternatives. The primary impacts would be temporary and would affect noise, air quality, and transportation.

# 1.0 Purpose and Need for Action

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The United States Air Force (USAF) Air Mobility Command (AMC) proposes to modify a fuel storage facility at Charleston Air Force Base (Charleston AFB) in Charleston County, South Carolina. Charleston AFB is located within the City of North Charleston, 10 miles northwest of the City of Charleston (Figure 1-1). Currently, the Charleston AFB aircraft fueling facility includes five storage tanks totaling 72,960 barrels (3,064,020 gallons) of storage capacity. The five tanks include three 4,050-barrel (170,000-gallon) tanks, one 6,050-barrel (254,000-gallon) tank, and one 54,760-barrel (2,300,000-gallon) tank. Throughput can exceed 286,000 barrels of fuel per month. Fuel is transferred through an 8-inch line to the flight line. The existing fuel transfer line passes under the Civil Engineering (CE) compound between the storage tanks and the flight line. The current storage capacity is considered too limited to meet peak demand, as has been evident in the last 2 years, and both the size and location of the fuel transfer line should be changed to increase efficiency and improve safety.

The purpose of this EA is to provide information in support of a decision process to determine which of three alternatives would best meet the purpose and need stated above. The three alternatives are: the No-Action Alternative, the Proposed Action (i.e., the removal of existing tanks, abandonment of transfer line, and replacement with larger tanks at the same site and a rerouted fuel transfer line), and a Third Alternative (i.e., placement of the new tanks at the “Hot Cargo Zone” and installation of fuel transfer and supply lines).

## 1.1 Facility Background

Charleston Air Force Base (Charleston AFB) is located within the City of North Charleston in Charleston County, South Carolina, 10 miles northwest of the City of Charleston. The Base and the towns of Charleston and North Charleston lie in the coastal zone of South Carolina. The Base occupies property formerly owned by the municipal airport. The installation occupies 3,733 acres of contiguous property. A vicinity map is presented on Figure 1-1.

The area that is currently Charleston AFB was first used as a municipal airport for the area in 1931. The site was activated as an Army air base shortly after the Japanese attack on Pearl Harbor. The Base was closed after World War II and the property returned to the City of Charleston. In 1952 the Base was reactivated and expanded with an agreement that the City of Charleston and the Air Force would jointly use the runways. Since that time several different missions have been assigned to Charleston. Currently, Charleston is an AMC Base and the runways are still used by both Charleston County Aviation Authority and the Air Force under a joint use agreement.

The Charleston AFB commander is responsible for accomplishing the Base’s mission. The commander’s staff of military personnel and civil service employees is responsible

for the overall planning, direction, scheduling, assignment, and funding associated with mission requirements.

Charleston AFB is home to the 437<sup>th</sup> Airlift Wing (AW). The 437<sup>th</sup> AW is the host unit at Charleston AFB and, together with the Air Force Reserve 315<sup>th</sup> AW, provides a large part of the AMC's Global Reach airlift capabilities. In addition, the 16<sup>th</sup> Airlift Squadron was reactivated in July 2002, creating a fourth active-duty C-17 squadron for the Base. The mission of the 437<sup>th</sup> AW is to command assigned airlift and supporting units; provide for the airlift of troops and passengers, military equipment, mail, and aeromedical airlift and to participate in operations involving the air-land or air-drop of troops, equipment, and supplies when required. Apart from having a heavy air-drop commitment and a demanding humanitarian mission, Charleston AFB's mission requirements include supporting U.S. embassies, supplying humanitarian airlift relief to victims of disasters, and air-dropping troops into the heart of contingency operations in hostile areas.

The 315<sup>th</sup> AW is an Associate Reserve component and uses the C-17 and C-141B aircraft, facilities, and equipment of the host 437<sup>th</sup> AW for its training activities. These reservists directly support their active duty counterparts in operation and training, maintenance, aerial port, civil engineering, personnel, and communications, as well as providing aeromedical evacuation capability. Personnel of the 315<sup>th</sup> AW augment the 437<sup>th</sup> AW to ensure full use of the active wing's aircraft, maintenance, and aerial port facilities. The 315<sup>th</sup> AW's three maintenance squadrons, which include both full-time Air Reserve technicians and weekend reservists, are totally integrated with the 437<sup>th</sup> AW and perform one-third of the Base's aircraft maintenance workload.

Assigned to Charleston AFB by Headquarters, Air Combat Camera Service, the 1<sup>st</sup> Combat Camera Squadron is one of two combat documentary squadrons. This squadron, supported by five detachments, provides photographic and videography services to a wide range of DoD customers, including the operational commanders and the National Command Authority. The squadron consists of photojournalists, videographers, equipment repair technicians, and support personnel, and provides worldwide image-gathering and documentation services as directed by Headquarters (AFCEE/Zapata Engineering P.A., 2002).

Additional tenant organizations include:

- 412<sup>th</sup> Logistics Support Squadron
- Air Force Audit Agency
- Air Force Office of Special Investigations Detachment 310
- American Federation Government Employees Local 1869
- Area Defense Counsel
- Army Air Force Exchange Service
- Defense Commissary Agency
- Defense Courier Service
- 33<sup>rd</sup> Flight Test Squadron
- 373<sup>rd</sup> Training Squadron
- US Postal Service
- AF Reserve Officers' Training Corps (ROTC) Detachment 772
- Civil Air Patrol

- US Navy Construction
- American Red Cross
- Southeast Air Defense Sector
- Boeing C-17 Field Service
- Boeing C-17 Recovery & Modifications
- United Airlines
- Pratt & Whitney
- Document Automation and Production Service

## 1.2 Purpose of the Proposed Action

AMC proposes to modify a fuel storage facility at Charleston AFB. The purpose of the Proposed Action is to remove 4 existing fuel storage tanks and construct two 80,000-barrel JP-8 fuel tanks, abandon an existing 8-inch fuel delivery pipeline, and install a new 12-inch fuel delivery pipeline.

## 1.3 Need for Proposed Action

The Base currently receives fuel from an offbase fuel transfer depot via an underground transfer line and stores the fuel onbase at the tank farm. During the last several years, the level of air traffic staging at the Base has increased measurably and has placed a substantial demand on those facilities. Base personnel indicate that at times, the fuel can be transferred from the offsite depot and very soon thereafter be used to fuel aircraft.

Concern exists that without sufficient settling in the storage tanks, the fuel could contain water or debris. In the current setup, fuel must pass through one of the 4,050-barrel tanks and the 6,050-barrel tank during fueling activities. This limits flexibility in storage and fueling operations and these tanks cannot be considered static storage capacity. Removal of the four small fuel storage tanks and replacement with two 80,000-barrel tanks would substantially increase the capacity of the fuel tank farm and provide flexibility during fueling operations. This modification would provide the onsite storage capacity needed to meet demand and control the quality of the fuel by allowing solids to settle for a reasonable period prior to use.

An additional need for the Proposed Action relates to abandoning the 8-inch-diameter tank transfer line and replacing it with a 12-inch line. The route of the existing tank farm transfer line extends in an easterly direction through the CE complex between the tank farm and the plane fueling area; the location of the existing line presents potential fuel line maintenance problems as well as safety concerns. The larger line would greatly improve fuel delivery capability.

Therefore, the Proposed Action would help Charleston AFB expand the support capabilities to meet the increased demands on the Base infrastructure and at the same time eliminate potential safety and maintenance concerns.

## 1.4 Objectives of Proposed Action

The objectives of the Proposed Action are to:

- Increase fuel storage capacity
- Improve fuel quality by upgrading storage and handling capabilities
- Improve safety of the existing fuel transfer operations
- Decrease the time required for refueling

## 1.5 Related Environmental Documents

The following documents were used in the preparation of this EA:

AFCEE/ECS. 2003. *Integrated Natural Resources Management Plan: Update for 2003-2007*. Charleston Air Force Base and North Auxiliary Air Field, South Carolina.

AFCEE/ECS (Pinnacle). 2003. *2003 Wetlands and Threatened and Endangered Species Survey*. Charleston Air Force Base, South Carolina.

AFCEE/Zapata Engineering P.A. 2002. Charleston Air Force Base General Plan.

Atlanta Environmental Management. 2004. Stormwater Pollution Prevention Plan. Charleston Air Force Base, South Carolina.

## 1.6 Decision to Be Made

The existing facilities present substantial challenges for meeting the Base's mission needs. Selection of an acceptable alternative to meet the objectives listed in Section 1.4 would result in improved safety for the operations and an increased capacity for refueling operations. Adoption of the No-Action Alternative would maintain the present facilities and operations.

## 1.7 Applicable Regulatory Requirements, Permits, and Coordination

This EA has been conducted in accordance with the President's Council on Environmental Quality (CEQ) regulations, Title 40 of the CFR §§1500-1508, as they implement the requirements of the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (U.S.C.) §4321, *et seq.*, Title 32 of the CFR §§ 989, and AFI 32-7061, *The Environmental Impact Analysis Process*.

These regulations require federal agencies to analyze the potential environmental impacts of the Proposed Action and alternatives and to use these analyses in making decisions on a Proposed Action. Cumulative effects of other ongoing activities also must be assessed in combination with the Proposed Action. The CEQ was instituted to oversee federal policy in this process. According to the CEQ regulations, an EA is required to accomplish the following objectives:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).
- Aid in an agency's compliance with NEPA when an EIS is not necessary and facilitate preparation of an EIS when necessary.

AFI 32-7061, as promulgated in 32 CFR 989, specifies the procedural requirements for the implementation of NEPA and preparation of the EA and directs Air Force officials to consider environmental consequences as part of the planning and decision-making process. 32 CFR 989.14(g) requires preparation of a Finding of No Practical Alternative (FONPA), which must be submitted to the Major Command Environmental Planning Function when the alternative selected is located in wetlands or floodplains.

Other environmental regulatory requirements relevant to the Proposed Action and alternatives also are identified in this EA. Regulatory requirements under the following laws and programs, among others, will be assessed:

- Noise Control Act of 1972
- Clean Air Act (CAA)
- Clean Water Act (CWA)
- National Historic Preservation Act
- Archaeological Resources Protection Act
- Endangered Species Act of 1973
- Coastal Zone Management Act
- Resource Conservation and Recovery Act (RCRA)
- Toxic Substances Control Act (TSCA) of 1970
- Occupational Safety and Health Act (OSHA)

Requirements also include compliance with Executive Order (EO) 11988 (Floodplain Management); EO 11990 (Protection of Wetlands); EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations); and EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks).

## **1.8 Scope of the Environmental Assessment**

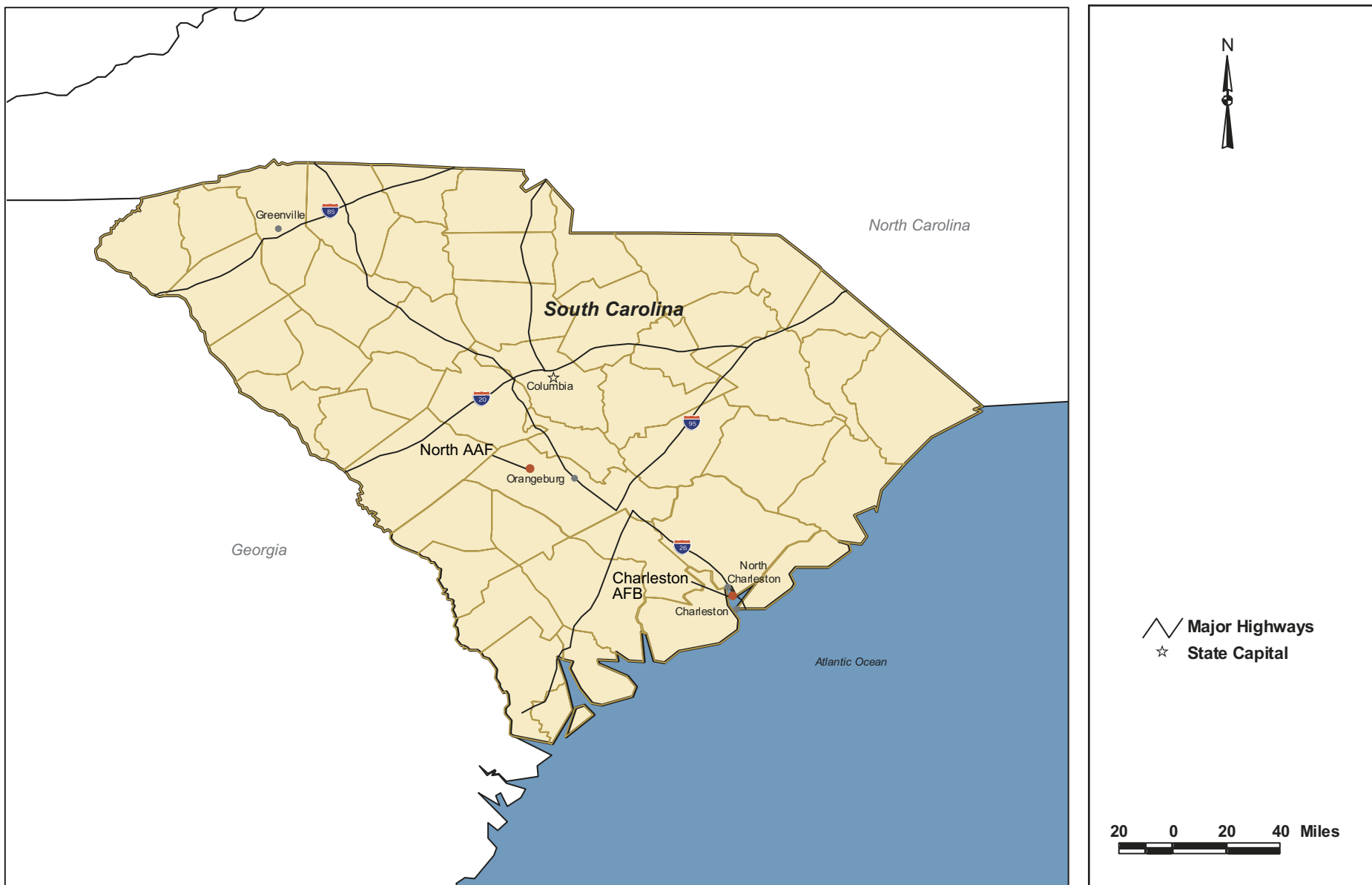
This document was prepared in accordance with the requirements of NEPA CEQ regulations of 1978, and 32 CFR Part 989. To initiate the EA, the proponent (Charleston AFB) submitted an AF Form 813 – Request for Environmental Impact Analysis (Appendix A).

This EA documents and analyzes the potential environmental and socioeconomic effects associated with the No-Action Alternative, the Proposed Action, and one additional alternative and focuses on evaluation of environmental effects that are reasonably foreseeable at the present time.

## 1.9 Document Organization

This EA follows the organization established by the CEQ regulations (40 CFR, Parts 1/500-1508) and consists of the following:

- 1.0 Purpose and Need for Action
- 2.0 Description of the Alternatives Including the Proposed Action
- 3.0 Affected Environment
- 4.0 Environmental Consequences
- 5.0 List of Preparers
- 6.0 List of Contacts
- 7.0 References
- Appendices



**FIGURE 1-1**  
**BASE LOCATION**  
FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
CHARLESTON AFB, SOUTH CAROLINA

## **2.0 Description of the Alternatives Including the Proposed Action**

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### **2.1 Introduction**

This section describes the alternatives analyzed in this EA (No-Action Alternative, the Proposed Action, and one additional alternative). This section includes a discussion of the criteria used for selecting the alternatives and a summary of the alternatives considered but not carried forward for detailed analysis.

### **2.2 Selection Criteria for Alternatives**

To be considered a reasonable alternative, the removal and replacement of the fuel storage tanks, abandonment of the 8-inch transfer line, and installation of a 12-inch transfer line should improve the safety and quality of the fueling operations as well as increase capacity of the operations. The No-Action Alternative is carried forward for analysis in accordance with NEPA 11052.14 (d). Reasonable alternatives for removing and replacing four existing tanks and replacing an 8-inch fuel transfer line with a 12-inch transfer line should accomplish the following:

- Meet or exceed state environmental requirements for fuel storage operations.
- Comply with AF and Federal Aviation Authority planning and design manuals, design standards, and safety requirements for airfield operations.
- Improve operational flexibility in support of aircraft refueling operations.
- Provide a reasonable approach.
- Be environmentally sound and avoid or minimize impacts to natural resources and the human environment.

### **2.3 Alternatives Considered but Eliminated from Detailed Study**

A potential site located 1,200 feet west of the existing tank farm was considered for the project. This alternative was not evaluated in detail because that area is designated for outdoor recreational purposes (picnic areas, family camping, and softball fields). Outdoor recreational facilities are important at Charleston AFB and suitable land is limited. Therefore, because of land use considerations, locating the tank farm at that site was rejected as an alternative.

## 2.4 Description of Proposed Alternatives

### 2.4.1 No-Action Alternative

Inclusion of the No-Action Alternative is prescribed by CEQ regulations. Although the No-Action Alternative does not satisfy the purpose of and need for the Proposed Action, it serves as a baseline against which the impacts of the Proposed Action can be evaluated.

Under the No-Action Alternative, the current aircraft fueling operations would continue (Figure 2-1). According to Base personnel, in the past, the facility has provided more than 286,000 barrels of fuel a month. The Base would continue to have a very limited storage capacity (62,860 barrels static storage) under the No-Action Alternative. These operational constraints would severely limit flexibility and place tremendous demands on managing incoming supplies.

Under the No-Action Alternative, the 8-inch fuel transfer line would not be replaced. The same fuel delivery capabilities would exist. The 8-inch line would continue to represent a safety issue for the building occupants in the CE complex under which the transfer line extends. If a problem were to occur in the line, the health and well being of the CE complex occupants would be at risk. Likewise, if the fuel transfer line were in need of maintenance, excavating the line to repair it or remove contaminated soil would be costly and disruptive to ongoing operations of the fuel maintenance facility and the occupied buildings.

### 2.4.2 Proposed Action: Removal of Four Fuel Storage Tanks and Fuel Line and Installation of New Tanks and Line at Existing Tank Farm

The USAF proposes to remove three 4,050-barrel (170,000-gallon each) and one 6,050-barrel (254,000-gallon) fuel storage tanks and spill containment areas (Figure 2-2). The 54,760-barrel tank would remain operational. Under the Proposed Action, the USAF would abandon in place an 8-inch fuel transfer line. The storage tanks would be replaced with two 80,000-barrel (3,360,000-gallon each) tanks and the fuel transfer line would be replaced with approximately 5,800 feet of 12-inch line. The fuel transfer line would be rerouted on the western side of Building 675 and then east to connect with the existing fuel distribution system. This would result in a fuel storage facility with a total capacity of 214,760 barrels (two 80,000-barrel tanks and one 54,760-barrel tank).

Under the Proposed Action, the new tanks would be located in the same area as the existing fuel storage tanks (Figure 2-2). The tanks would be approximately 110 feet in diameter and 48 feet in height. The footprint of the fuel storage facility would be expanded to accommodate the increased spill containment requirements. The spill containment area for the existing large tank would be maintained. A new spill containment area would have to be constructed south and west of the existing large tank and would have to accommodate 110 percent of the total capacity of the largest tank. The new spill containment area would have to provide 88,000 barrels (3,696,000 gallons or 494,000 cubic feet) of containment volume. The size of the containment area would depend upon the height of the containment berms. The surface area could vary between approximately 62,000 square feet and 123,530 square feet (Table B-2, Appendix B).

Assuming the spill area is 5 feet deep, then the footprint of the containment area would cover 98,840 square feet.

Installation of the 12-inch fuel transfer line would follow a path that would extend north of Building 675, north of Building 714, east toward the ready apron, then angle north under Taxiway D, east under Taxiway E, and then east to the fueling facility (Figure 2-3). This would result in two taxiway crossings.

The Proposed Action would accomplish all of the objectives listed in Section 1.4 and would meet all of the criteria listed in Section 2.2.

### **2.4.3 Third Alternative: Removal of Four Fuel Storage Tanks and Fuel Line and Installation of New Tanks and Line Near Hot Cargo Zone**

The Third Alternative includes removal of three 4,050-barrel and one 6,050-barrel storage tanks and abandonment of the 8-inch fuel transfer line. These facilities would be replaced with two 80,000-barrel tanks located near the Hot Cargo Zone on the southwest portion of Charleston AFB (Figure 2-4). Munitions are stored in the Hot Cargo Zone. This alternative would require the installation of approximately 5,800 feet of fuel transfer line from the existing tank farm to the refueling area. The fuel transfer line would be rerouted on the western side of Building 675 and then east to connect with the existing fuel distribution system. This alternative also would require installation of approximately 5,500 feet of 12-inch line extending from the tanks installed in the Hot Cargo Zone to the refueling area.

Under the Third Alternative, the footprint of the fuel tanks and containment area would cover 98,840 square feet, similar to the Proposed Action. The length of the 12-inch fuel transfer line supplying fuel to the aircraft would be shorter than in the Proposed Action. The 12-inch fuel transfer line would cross under Taxiway K.

Because there is no existing fuel supply line, a fuel line connection would be required to receive fuel from the offbase fuel storage depot. The main supply line from the fuel storage depot enters the Base at the northern end of the runway. There would be two options to provide fuel supply:

- Extend a supply line north and connect with the line as it crosses the Base to the existing fuel storage facility; this would require installation of approximately 9,400 feet of line and cross at least four taxiways.
- Extend a supply line around the southern end of Runway 3 and then in a northeast direction. A connection with the supply line would occur near the intersection of Redmont and Aviation Access Roads. This is a distance of 8,500 to 9,000 feet, crossing many taxiways and passing near the municipal airport facilities.

The Third Alternative would meet three of the four objectives listed in Section 1.4 and three of the five criteria listed in Section 2.2. Locating the fuel storage facility in the Hot Cargo Zone is not considered the safest alternative. In addition, the Third Alternative is not considered reasonable because of the requirements to install two lines and cross numerous taxiways.

## 2.5 Identification of Preferred Alternative

The USAF's preferred alternative for this EA is to implement the Proposed Action as described in Section 2.4.2.

## 2.6 Comparison of the Environmental Impacts of Alternatives

Table 2-1 compares the environmental and socioeconomic impacts of the alternatives described above.

**TABLE 2-1**

Summary of Potential Environmental and Socioeconomic Consequences

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Resource	Environmental and Socioeconomic Consequences		
	Proposed Action	Third Alternative	No-Action Alternative
Air Quality	Minor emissions during construction and possibly emissions resulting from spills and volatilization post-construction.	Minor emissions during construction and possibly emissions resulting from spills and volatilization post-construction.	No impacts.
Noise	Minor noise impacts related to construction activities	Minor noise impacts related to construction activities	No impacts
Wastes and Hazardous Materials	Potential exposure to petroleum-contaminated soil and temporary exposure of groundwater plume. Area of Concern (AOC) O is located at the fuel storage area.  Short-term, temporary generation of construction and demolition (C&D) debris.	Short-term, temporary generation of C&D debris. No impact on Environmental Restoration Program (ERP).	No impacts.
Water Resources			
• Water Quality	Potential minor impact during and post-construction due to spills.	Potential minor impact during and post-construction due to spills.	No impacts.
• Floodplains	No impacts	No impacts	No impacts
• Wetlands	No impacts	No impacts	No impacts
• Surface Water	No impacts	No impacts	No impacts

**TABLE 2-1**

Summary of Potential Environmental and Socioeconomic Consequences

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Resource	Environmental and Socioeconomic Consequences		
	Proposed Action	Third Alternative	No-Action Alternative
Biological Resources			
• Vegetation and Wildlife	Loss of 0.5 acres of open space	Loss of 2.27 acres of partially forested space near existing painted bunting ( <i>Passerina ciris</i> ) habitat	No impacts.
• Federal-listed, Threatened or Endangered Species and State-listed Threatened or Endangered Species	No impacts	No impacts	No impacts
Socioeconomic Resources	Short-term positive impacts resulting from construction-related employment.	Short-term positive impacts resulting from construction-related employment.	No impacts.
Cultural Resources	No impacts	No impacts	No impacts
Land Use	Conversion of approximately 0.5 acres of maintained lawn to tanks and containment systems.	Conversion of approximately 2.27 acres of open land to tanks and containment systems.	No impacts.
Transportation Systems	Temporary impacts to local traffic via trucks removing demolition debris.	Temporary impacts to local traffic via trucks removing demolition debris.	No impacts
Airspace/Airfield Operations	Positive impact on airfield operations due to ability to meet airlift mission.	Positive impact on airfield operations due to ability to meet airlift mission.	No impacts
Safety and Occupational Health	No impacts.	Additional risk to Base due to location within explosive safety arcs and near runway clear area.	Continued safety issue for CE complex occupants
Environmental Management			
• Pollution Prevention	Minor	Minor	No impacts
• Geology and Soils	Temporary impact to onsite soils.	Temporary impact to onsite soils.	No impacts.
Environmental Justice	No impacts	No impacts	No impacts
Indirect and Cumulative Impacts	Minor	Minor	No impacts
Unavoidable Adverse Impacts	No impacts	No impacts	No impacts

**TABLE 2-1**

Summary of Potential Environmental and Socioeconomic Consequences

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

<b>Environmental and Socioeconomic Consequences</b>			
<b>Resource</b>	<b>Proposed Action</b>	<b>Third Alternative</b>	<b>No-Action Alternative</b>
Relationship between Short-term Uses and Enhancement of Long-term Productivity	No impacts	No impacts	Continued operational constraints in refueling operations.
Irreversible and Irretrievable Commitment of Resources	No impacts	No impacts	No impacts
Coastal Zone Management	No impacts	No impacts	No impacts



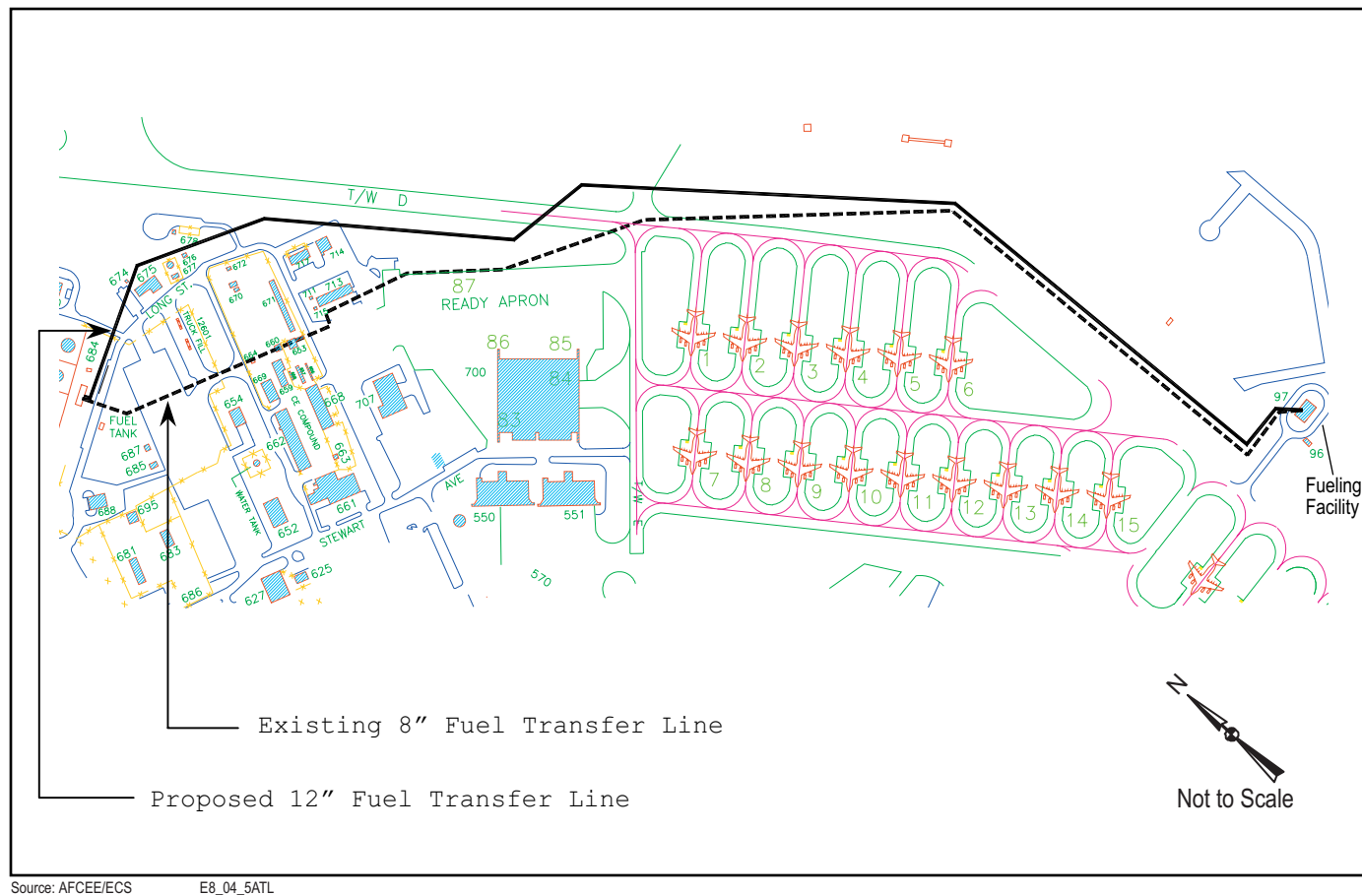
**FIGURE 2-1**  
 LOCATION OF NO ACTION ALTERNATIVE  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



- |   |   |
|---|---|
| <span style="color: yellow;">—</span> Roads   | <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Containment Basins |
| <span style="background-color: orange; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Existing Fuel Tank | <span style="background-color: lightblue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Wetlands        |
| <span style="background-color: green; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Proposed Tanks      | <span style="background-color: tan; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Buildings             |



**FIGURE 2-2**  
**LOCATION OF PROPOSED ACTION**  
*FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT*  
*CHARLESTON AFB, SOUTH CAROLINA*



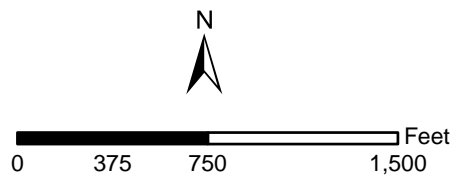
Source: AFCEE/ECS

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**FIGURE 2-3**  
**LOCATION OF FUEL LINES**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



- Charleston AFB Boundary
- Roads
- Buildings



**FIGURE 2-4**  
**LOCATION OF THIRD ALTERNATIVE**  
*FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT*  
*CHARLESTON AFB, SOUTH CAROLINA*

## 3.0 Affected Environment

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### 3.1 Introduction

Charleston AFB occupies 3,733 acres of contiguous property within the coastal zone of South Carolina between the Ashley and Cooper Rivers. In 1996, Hunley Park Housing Area was transferred to the Air Force from the Navy. Hunley Park is located near the Ashley River just across Dorchester Road from Charleston AFB. The development consists of 271 acres of mostly residential land. The Proposed Action is located at Charleston AFB and would have no impact on Hunley Park. Therefore, discussions of affected environments and potential impacts are limited to Charleston AFB and do not include Hunley Park.

### 3.2 Air Quality

Currently, all areas of South Carolina attain (meet) all national air quality standards, including the 1-hour ozone standard. In 1997, the U.S. EPA revised the national standard for ground-level ozone from a 0.12-part-per-million (ppm) 1-hour "peak" standard to a 0.08-ppm 8-hour "average" standard. This standard, which has not yet been implemented, is commonly referred to as the "8-hour ozone standard." When implemented, the 8-hour ozone standard could result in numerous areas of the state being determined not to meet the standard and being designated as non-attainment for ground-level ozone (South Carolina Department of Environmental Control [DHEC], 2004). Charleston County is working with the DHEC and the EPA to reduce pollutants that form ground-level ozone. The goal is to meet new federal pollution requirements by the end of 2007 (Charleston County, 2004)).

### 3.3 Noise

At Charleston AFB, aircraft frequently land and take off, and runways are shared with the Charleston International Airport. During takeoffs and landings, the noise levels can reach 140 to 150 decibels (dB) and aircraft on the ground may emit noise in the 90- to 120-dB range. The primary noise concern at Charleston AFB is related to airfield operations. DoD policy for addressing noise is implemented through establishment and enforcement of Air Installation Compatible Use Zones (AICUZs) (Figure 3-1). The AICUZ program requires an extensive analysis of the effects of aircraft noise, aircraft accident potential, and land use development on Charleston AFB and surrounding communities.

DoD guidance for AICUZs establishes compatible land uses based on safety and noise thresholds. Land use guidelines include recommendations for four noise zones (65 dB to greater than 80 dB) on a Day-Night Average A-weighted Sound Level (DNL). The DNL system is based on a 24-hour day and applies a "dB penalty" to noise at night. The

guidelines recommend land uses which are compatible with airfield operations yet allow the maximum beneficial use possible of adjacent properties (DoD, 1977; DoD, 2002).

Charleston's AICUZ study was updated in February 2004. The study was initiated to address noise-related concerns for the surrounding communities. In the past, recommendations to accommodate local concerns have been incorporated into the Charleston AFB Joint Land Use Study, a cooperative effort by Charleston AFB and local governmental entities potentially affected by flight operations at the Base.

Currently there are several incompatible land uses and proposed development projects that are located within the AICUZs. Medium and high density residential development is scattered within the noise contours around the Base on all sides. DoD guidance states that housing should be located outside of the 65-dB DNL noise contour.

As part of its standard operating procedures, Charleston AFB attempts to minimize noise disturbances to the community. These procedures include establishing a 2,000-foot minimum pattern altitude, prohibiting, when possible, all overflights of identified historic sites and hospitals, limiting maximum power takeoffs, and prohibiting the practice of circling approaches (600 feet above ground level) between 11:00 pm and 7:00 am (AFCEE/Zapata Engineering P.A., 2002).

## 3.4 Wastes and Hazardous Materials

### 3.4.1 Solid Waste

Charleston AFB removes municipal solid waste (MSW) from the installation using a solid waste disposal contractor. The contractor collects MSW from receptacles and transports it to a waste-to-energy incinerator. No onbase landfills are in operation.

Large items that cannot be incinerated are placed in roll-offs and taken to a municipal landfill. Industrial wastes are taken to the HazMat Pharmacy and disposed of using the Blanket Purchasing Agreement set up through Defense Reutilization Management Office (DRMO).

The Medical Group generates biohazards medical waste that is picked up by contractor and transported to a permitted incinerator facility in SC. This incinerator is designed and permitted to handle infectious waste. Solid waste generated by aircraft arriving from overseas is picked up by contractor and taken to the same incinerator facility in much the same way as medical waste.

Charleston County picks up recyclable materials such as glass, plastic bottles, metal cans, mixed paper (includes newspapers and magazines), cardboard, and wood from collection containers around the Base, including military family housing. C&D debris such as concrete, asphalt, and steel rebar is recycled. C&D rubble that cannot be recycled is disposed of in a C&D landfill. Other items that are reused or recycled on Charleston AFB include C-17 tires, scrap metal, anti-freeze, JP-8, batteries, CDs, cooking oil from dining facilities, bubble wrap, and wooden pallets (AFCEE/Zapata Engineering P.A., 2002).

### 3.4.2 Hazardous Materials

Charleston AFB operations involving hazardous materials include aircraft and vehicle maintenance, fuel storage and dispensing, operation of utility systems, general base maintenance activities, and fire training. Currently the materials are managed through the Treatment, Storage, and Disposal Facility (TSDF). Fuels used and stored at Charleston AFB include JP-8, diesel fuel, AVGAS (aircraft fuel) and MOGAS (automobile fuel) (AFCEE/Zapata Engineering P.A., 2002).

Hazardous materials are stored onsite in containers, which serve as designated points. Once the containers at the satellite accumulation points are filled, they are transferred to the permitted hazardous waste storage yard (Building 691) within 72 hours. The hazardous waste storage yard (permanent storage facility) is permitted under a Resource Conservation and Recovery Act (RCRA) Part B permit. The RCRA-permitted facility is a fenced area, which includes seven containment pads with secondary containment. The facility has a container storage capacity of 12,260 gallons. Four 5,000-gallon tanks are typically used for waste fuels and oils. Some sporadic generators of hazardous waste may take the waste directly to Building 691 for proper storage. Hazardous waste is generally handled through the DRMO.

Emergency spill clean-up equipment and materials are located at Building 691 (hazardous waste storage yard shed), at Building 168 (fire station), and in a hazardous materials (HAZMAT) truck. Generator shops have spill clean-up supplies for responding to and cleaning up small spills in their area (AFCEE/Zapata Engineering P.A., 2002).

The Air Force Pollution Prevention Program focuses on both the domestic and industrial component of the waste stream. Charleston AFB has a robust program to mandate industrial hazardous waste collection and recycling activities in the industrial portion of the Base as well as military family housing.

Numerous Environmental Restoration Program (ERP) sites are present near the Proposed Action location (Figure 3-2). No ERP or other hazardous waste sites are present at the Third Alternative location (Figure 3-3).

#### 3.4.2.1 Environmental Restoration Program

The Air Force has a program designed to identify, characterize, and remediate environmental contamination on its bases. The program establishes a process to evaluate past disposal sites, control potential hazards to human health and the environment, and conduct environmental restoration activities as required.

##### Area of Concern O (AOC O)

AOC O encompasses the Charleston AFB tank farm at the site of the Proposed Action (Figure 3-3). Soil samples from two depth intervals were collected and analyzed in 1997: shallow (0.5 to 1.5 feet) and intermediate (3 to 4 feet) (USAF, 1998). Gasoline was present in five of eight samples and reached a maximum concentration of 12,000,000 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) in a sample collected from the 3- to 4-foot depth interval (Table 3-1). Analytical results indicate that the soil contains purgeable petroleum hydrocarbons and volatile organic compounds (VOCs), including trimethylbenzenes,

propylbenzenes, butylbenzenes, and isopropyl-toluenes for two of the samples. These compounds are consistent with a subsurface JP-8 release in the area.

**TABLE 3-1**

AOC O Subsurface Soil Contamination

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Location	Gasoline (µg/kg)	Unidentified Organics (Purgeable) (µg/kg)	Unidentified Organics <sup>a</sup> (Extractable) (µg/kg)	Benzo(a)pyrene (µg/kg)
Screening Level	470,000	NV	NV	0.088
SB-01-01	ND	1800	12,900	NR
SB-01-02	2,050,000	ND	417,000	ND
SB-02-01	5,160,000	ND	6,760,000	NR
SB-02-02	12,000,000	ND	10,600,000	ND
SB-03-01	ND	25,200	ND	NR
SB-03-02	ND	233,000	345,000	0.129
SB-04-01	4500	ND	23,700	NR
SB-04-02	1,210,000	ND	19,500	ND

SB-XX-01 = 0.5-1.5 feet below ground surface

SB-XX-02 = 3 to 4 feet below ground surface

<sup>a</sup> has characteristics resembling JP-8 fuel

NV no value

ND not detected

NR not reported

Nine chemicals were identified as chemicals of potential concern (COPCs), including gasoline, unidentified purgeable petroleum hydrocarbons, unidentified extractable petroleum hydrocarbons, benzo(a)pyrene, aluminum, arsenic, beryllium, iron, and thallium.

### Solid Waste Management Unit (SWMU) 72

SWMU 72 is an inactive coal ash disposal site located southwest of AOC O and the fuel tank farm. The area's designation is based on historical information, not the collection of recent soil samples. Because of its past use, there is a risk of elevated concentrations of heavy metals in the soil (AFCEE, 1995).

## 3.5 Water Resources

### 3.5.1 Water Quality

According to the *State of South Carolina Section 303(d) List for 2000* (DHEC Bureau of Water, 2000), the Ashley River is included on the 303(d) list of waters impacted by urban runoff. Information regarding Ashley River stream segments included on the 303(d) list is provided in Table 3-2. The Cooper River is not included on the 303(d) list.

**TABLE 3-2**

Ashley River Stream Segments Listed on the 2000 South Carolina 303(d) List  
*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Stream Segment	Location in Relation to Charleston AFB	Station Number	Impaired Use	Cause
Ashley River at SC 165	Greater than 10 miles upstream	CSTL-102	Aquatic Life and Recreation	DO and fecal coliform
Ashley River at Magnolia Gardens	Approximately 500 feet downstream	MD-049	Aquatic Life and Recreation	DO, copper, and fecal coliform
Ashley River at SA LRR Bridge	Approximately 10 miles downstream	MD-052	Aquatic Life	DO
Ashley River between Leeds Avenue and Mouth of Church Creek	Approximately 4 miles downstream	MD-242	Aquatic Life and Recreation	DO and fecal coliform

Source: State of South Carolina Section 303(d) List for 2000, DHEC Bureau of Water

Water samples collected by DHEC from locations upstream and downstream of the Base indicate that fecal coliform and low dissolved oxygen (DO) levels are the primary causes of impairment. Water samples collected from downstream locations indicate that fecal coliform, low DO levels, and elevated copper levels are the primary causes of impairment. Currently, Total Maximum Daily Loads (TMDLs) have not been developed for the Ashley River.

Storm water runoff from the entire Base is described in detail in the Charleston AFB *Storm Water Pollution Prevention Plan* (Atlanta Environmental Management, May 2004) and includes components from industrial, residential, and recreational areas. The facility makes use of a variety of aboveground and subsurface drainage features and conduits to convey storm water runoff away from the property. The facility currently has seven National Pollutant Discharge Elimination System (NPDES) storm water outfalls and five NPDES Phase II outfalls.

Most storm water runoff from Charleston AFB drains into one of three streams:

- Golf Course Creek – located along the western portion of the Base. It flows west from the Base and empties into Popperdam Creek, a tributary of the Ashley River.
- Runway Creek – located near Runway 03/21. It flows south from the Base and empties into the Ashley River.
- Turkey Creek – located near Runway 15/33. It trends east from the Base and empties into Goose Creek, a tributary of the Cooper River (Atlanta Environmental Management, 2004).

### 3.5.2 Floodplains

None of the areas within the Charleston AFB boundaries lies within a designated 100-year floodplain. A small portion of the clear zone south of Runway 33 lies within the 500-year floodplain. The floodplain is associated with the headwaters of Filbin Creek. The use of this area as a clear zone effectively precludes development, which would otherwise have to comply with the Federal Emergency Management Agency's

development guidelines (AFCEE/Zapata Engineering P.A., 2002). Therefore, floodplains were eliminated as an issue warranting further analysis.

### 3.5.3 Wetlands

Wetlands are inundated areas, or areas where water is present either at or near the surface of the soil for distinguishable periods of time throughout the year. Local hydrology and prolonged soil saturation largely affect soil formation and development, as well as the plant and animal community composition in wetland areas.

The wetlands at Charleston AFB provide many important functions that benefit the Base such as floodwater attenuation, groundwater recharge, and wildlife habitat. Floodwater attenuation is of greatest direct benefit at those wetlands nearest buildings, roads, and runways. The largest wetlands also provide excellent habitat for large mammals (especially white-tailed deer).

Thirty wetlands were identified and delineated at Charleston AFB covering a total of 332.9 acres, as discussed in the Integrated Natural Resources Management Plan (INRMP) (AFCEE/ECS, 2003). Those wetlands are described in Table 3-3. The delineations were completed in 1997 and 2002. All but 2 of the 30 wetlands occurring on Charleston AFB are forested. All of the wetlands have been at least moderately disturbed by logging, minor fill at the wetland/upland boundary, and/or ditching. Phosphate strip mining has historically catastrophically disturbed some Charleston AFB wetlands (AFCEE/ECS [Pinnacle], 2003). The Proposed Action is located adjacent to wetland CH25 (Figure 3-4). The Third Alternative would be located near wetland CH11 (Figure 3-5).

**TABLE 3-3**

Wetlands Identified at Charleston AFB

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Wetland ID	Classification1	Area (Acres)	Lineal Feet
CH1	PFO1A	3.98	1,687.52
CH2	PFO1J	0.34	495.61
CH3	PFO1E	1.69	1,842.17
CH4	PFO1C	1.58	1,681.21
CH5	PFO1A*	0.68	835.44
CH6	PFO1A*	3.09	2,070.40
CH7	PFO1E	2.44	1,783.55
CH8	PFO1A	4.03	2,450.76
CH9	PFO1E	4.68	2,203.89
CH10	PEM1J*	1.47	1,238.32
CH11	PFO1E/F*	21.50	5,430.09
CH12	PFO1E/F*	82.84	10,361.67
CH13	PFO1E/F	110.30	20,596.06
CH14	PSS1F*	2.98	2,203.16
CH15	PFO1E/F	7.83	2,721.85
CH16	PFO1C*	0.95	1,156.42

**TABLE 3-3**

Wetlands Identified at Charleston AFB

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Wetland ID	Classification <sup>1</sup>	Area (Acres)	Lineal Feet
CH17	PFO1C*	0.75	927.47
CH18	PFO1A*	3.97	2,982.55
CH19	PFO1C	7.08	5,939.81
CH20	PFO1A	12.37	3,423.63
CH21	PFO1B	0.27	660.87
CH22	PFO1E*	25.15	4,864.23
CH23	PFO1E/F	12.84	6,195.54
CH24	PFO1B/H	2.69	1,436.67
CH25	PFO1E	2.26	1,769.58
CH26	PFO1E	0.88	914.02
CH27	PFO1C	6.35	3,266.10
CH28	PFO1C*	0.20	497.61
CH29	PFO1E/J*	7.71	3,489.92
Total Charleston AFB Acreage		332.90	

Source: AFCEE/ECS, 2003; 1 – Classifications follow Cowardin et al. (1979); \* Denotes ditched wetlands

Most of the land disturbance within the wetlands at Charleston AFB occurred prior to government ownership. The phosphate strip mining (which occurred between 1867 and 1937) has left large pits and furrows throughout the undeveloped lands. All of the wetlands near the perimeter of Charleston AFB have been affected by the strip mining.

Any impact to wetlands on Charleston AFB would require permits from the U.S. Army Corps of Engineers (USACE), Charleston District. Impact to wetlands at Charleston AFB, located in the Coastal Zone, would require additional permit approval by the DHEC Office of Ocean and Coastal Resource Management (OCRM). Many permits are contingent upon submission of a satisfactory mitigation plan to offset any proposed impact. Mitigation requirements vary greatly, depending upon the quality and acreage of wetlands to be impacted, the type of mitigation proposed, and the location of the mitigation site relative to the impacted wetland.

### 3.5.4 Surface Water

The hydrology of Charleston AFB is driven by a combination of low elevation and runoff from paved areas. Much of the natural hydrology has been altered by development, including road berms and large impervious surfaces, historic phosphate strip mining, and ditching of water away from the runway (AFCEE/ECS [Pinnacle], 2003).

There are three streams on Charleston AFB:

- Golf Course Creek, which drains into Popperdam Creek, a tributary to the Ashley River

- Runway Creek, located near Runway 03/21, which drains into the Ashley River
- Turkey Creek near Runway 15/33, which drains into Goose Creek, a tributary of the Cooper River

The major drainage divide at the Base is located parallel to Runway 15/33, along the western edge of the flight line. Generally, all surface water originating at points east of the divide drains into Goose Creek and the Cooper River Basin. This area includes the airfield and associated pavements. A small area at the southern end of Runway 15/33 drains into Filbin Creek, a tributary of the Cooper River. Most unit maintenance facilities located along the flight line, all industrial facilities, and housing and community facilities drain into the Ashley River, which is located about 1,800 feet from the Base's boundary near Building 1849. A small area at the southwestern edge of the Base near the 1800 housing area drains to small tributaries of the Ashley River (AFCEE/Zapata Engineering P.A., 2002).

Other than the potential for impacts to water quality discussed above, the Proposed Action and the Third Alternative would not impact surface waters. Therefore, impacts to surface waters were eliminated as an issue warranting further analysis.

## 3.6 Biological Resources

Biological resources include the native and introduced plants and animals on and around Charleston AFB. The major biotic communities occur in open water, forested wetlands, oak-pine forest, and open fields. The open water areas are insignificant on Charleston AFB and are limited to drainage areas and ditches. The forested wetlands and freshwater swamps are located on the fringes of the installation. These areas are documented and described in the Charleston AFB INRMP (AFCEE/ECS, 2003).

### 3.6.1 Vegetation and Wildlife

#### 3.6.1.1 Vegetation

Most of Charleston AFB has been developed and consists mainly of buildings and paved areas (runways and airfields). Undeveloped areas account for approximately 650 acres or 10 percent of the base land area. These areas are mainly mesic hardwoods, dominated by sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*). A small amount of the Base was forested in pine plantations dominated by loblolly pine (*Pinus taeda*).

Semi-improved and improved landscapes cover the vast majority of acres at the Base. Vegetation in areas such as power lines and railroad rights-of-ways are maintained only when overgrown and unsightly. Other semi-improved areas include grassy areas adjacent to roads, taxiways, buildings, and shops. Typical cover on semi-improved land includes common Bermuda, centipede, rye, and St. Augustine grasses.

#### 3.6.1.2 Wildlife Species

Wildlife at Charleston AFB is primarily restricted to those species adapted to a suburban and urban environment. There are no suitable sites on the Base for hunting and fishing

due to its small size and urban setting. Game species present are bobwhite quail, mourning dove, cottontail rabbits, gray squirrels, and white-tailed deer.

### **3.6.2 Sensitive Species**

Sensitive species include those with federal endangered or threatened status, species proposed for listing as federal threatened or endangered, and state endangered, threatened, and species of special concern status. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes.

The predominance of development on the Base has diminished the number of potential wildlife habitat areas. An endangered species survey conducted on Charleston AFB in 1996 concluded that there are no threatened or endangered species known to inhabit the Base.

In 1989, Hurricane Hugo destroyed the only known nesting tree inhabited by the red-cockaded woodpecker (*Picoides borealis*), an endangered species, at Charleston AFB. A few other trees of sufficient age to serve as nesting sites exist on the Base; however, little if any suitable foraging habitat remains. Historical phosphate mining, past Base development, and the vast destruction of trees during Hurricane Hugo minimized the suitable habitat for any threatened or endangered species within the boundaries of the Base. Accordingly, the endangered species survey determined that there are no suitable habitats within the Base for any listed threatened or endangered wildlife species (AFCEE/ECS [Pinnacle], 2003). A Federal Species of Concern, the painted bunting was identified in two locations at Charleston AFB (Figure 3-6): CHTE1 (19 acres south of Runway 3) and CHTE2 (south and west of Runway 21). The location of the Proposed Action is not in or adjacent to these areas. However, CHTE1 is located near the Third Alternative (Figure 3-6). Appendix C lists the endangered, threatened, and candidate species potentially occurring in Charleston and Orangeburg Counties identified by the U.S. Fish and Wildlife Service (USFWS) and DHEC (DHEC, 2004).

### **3.6.3 Sensitive Habitats**

Sensitive habitats are described as those supporting threatened or endangered plant and animal species, areas determined to be exemplary natural communities by federal or state agencies, or habitat areas exceptionally fragile and susceptible to damage. Wetlands near the southern ends of the runways, representing painted bunting habitat, are the only habitats on the Base that meet these criteria.

## **3.7 Socioeconomic Resources**

The City of Charleston is a popular tourist destination, based largely upon the concentration of historic buildings located in the City's historic district. Charleston was the first city in the United States to establish a municipal historic district, saving numerous properties from demolition. Charleston County has a varied economy, which provides historical interest, culture, entertainment, education, and recreation to the area

residents and visitors. All of these elements, coupled with the coastal setting and favorable climate, combine to offer an outstanding quality of life for its residents.

From 1990 to 2000, Charleston County grew by 14,930 people (5 percent) to an estimated population of 309,969. The population of North Charleston grew by 9,423 people (13 percent) during the same period to a total population of 79,614. In 2000, the median age of Charleston County residents was 35 years; the median age of residents of North Charleston was approximately 29 years. The majority of the population in both locations was of working age, between 18 and 64. Approximately 9 percent of North Charleston residents are over 65 years of age, with 12 percent of Charleston County residents in that age group. The 2000 Census shows that 49.4 percent of the North Charleston population is black or African American and 44.8 percent are Caucasian. In Charleston County, the majority (61.9 percent) of the population is Caucasian, with blacks or African Americans making up 34.5 percent.

The principal interstate highways in the vicinity of Charleston AFB are Interstate 26, which connects Charleston to Columbia and Spartanburg, and Interstate 526, a beltway that loops to the Charleston metropolitan area from U.S. Highway 17 south of Charleston to U.S. Highway 17 north, in Mount Pleasant. These two interstate highways intersect just southeast of the Base boundary and provide excellent access for persons traveling to the Base from the Cities of Charleston and Mount Pleasant, or from more distant locales such as Columbia. Local access from Interstate 26 is provided by Aviation Avenue, which extends westward from the interstate to Arthur Drive on the eastern side of the Base. The closest source of commercial airline service is Charleston International Airport, which, due to its co-location, is only a few minutes drive from any part of the Base.

Approximately 3,160 active duty military personnel are assigned to Charleston AFB. Of this total, approximately 1,470 reside onbase, while the remaining 1,690 live in the surrounding community. In addition to the active duty Air Force personnel, Charleston is home to approximately 2,440 Air Force reservists serving in the 315<sup>th</sup> AW. The Base also employs some 1,350 civilian workers. The combined military, reservist, and civilian workforce is approximately 6,950 persons (AFCEE/Zapata Engineering P.A., 2002).

The Charleston region is the largest business and financial center in southeastern South Carolina and has seen steady expansion in recent years. The economy continues its robust growth with strong sectors in tourism and the service industry. In addition, the medical industry accounts for approximately 16,000 jobs. A large portion of the medical industry is in downtown Charleston where the Medical University of South Carolina and several hospitals are located.

Charleston is also home to the largest containerized cargo port on the southeast Atlantic and Gulf Coasts and the seventh largest in the world. More than 8 million tons of cargo pass through the Port of Charleston each year, including 6.8 million tons through the container port alone. Future developments on Daniel Island and the Cainhoy areas, as well as new industry in the region, are expected to promote economic growth in the future.

### 3.8 Cultural Resources

Areas potentially impacted by mission activities are surveyed as part of the AF Cultural Resources Management Program. Surveys conducted on Charleston AFB have indicated that there are no districts, structures, sites, or artifacts of historic, architectural, or cultural significance located within the boundaries of Charleston AFB. A team from the USACE completed a review of the Base's records pertaining to the preservation of historical and archaeological sites during a visit in October 1993 and had no significant findings. There are only two buildings onbase that are over 50 years old. These buildings are Quonset-style hangars that have been renovated numerous times to the point of losing their historical/architectural significance. A review conducted by the preservation specialists with the South Carolina State Historic Preservation Office (SHPO) in cooperation with the National Park Service, verified that no significant historical or archaeological resources have been identified within Charleston AFB. Therefore, cultural resources were eliminated as an issue warranting further analysis.

### 3.9 Land Use

AFI 32-7064 specifies three categories of natural resources management units: improved, semi-improved, and unimproved land.

Grounds categories are generally determined by the intensity of grounds maintenance required for their upkeep. At Charleston AFB, the improved grounds are those that require intensive maintenance or irrigation of some type such as mowing and landscaping. Semi-improved grounds are those that require infrequent or unscheduled mowing and maintenance and little or no irrigation. Unimproved grounds do not require any maintenance except occasional brush control.

Land use categories are subunits of each grounds category and are defined by the economic and social uses of the area, as opposed to the intensity of vegetation and maintenance needed. Charleston AFB land use is summarized in Table 3-4.

**TABLE 3-4**

Land Use on Charleston AFB

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Land Use	Grounds Category <sup>a</sup>	Typical Facilities
Administrative	I	Personnel, headquarters, legal and other support activities
Aircraft Operations and Maintenance	SI	Aircraft maintenance hangars and docks, control towers, light training facilities, flight operations buildings
Airfield	SI, I	Runways, taxiways, aircraft parking aprons
Community	I	Commissary, Base exchange, service stations, clubs, chapels, libraries
Housing (Family)	I	Single and multifamily housing for service members and their families
Housing (Unaccompanied)	I	Airmen dormitories and unaccompanied officer quarters

**TABLE 3-4**

Land Use on Charleston AFB

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Land Use	Grounds Category <sup>a</sup>	Typical Facilities
Industrial	SI	Utility systems, building maintenance facilities, Base support supply warehouse
Medical	I	Medical centers, hospitals, and clinics
Open Spaces	SI, UI	Buffer areas, out-lease areas
Outdoor recreation	I, SI	Swimming pools, tennis courts, golf courses, and other recreation facilities
Water	UI	Rivers, lakes, and streams

<sup>a</sup> I = Improved, SI = Semi-improved, UI = Unimproved

General land uses include residential, commercial, industrial, and recreational. Industrial uses include manufacturing, mining, and landfills. Charleston AFB lies in a developed area within the corporate boundaries of the City of North Charleston. Dorchester Road forms the boundary of the Base to the west and Interstate Highway 26 lies to the northeast. The eastern boundary is formed by the Southern Railroad tracks. Approximately 85 percent of the land at Charleston AFB is characterized as “improved or semi-improved grounds” This land use includes airfield, aircraft operations and maintenance, and industrial, administrative, and housing, community, medical, and outdoor recreation. The remaining 15 percent of land includes upland forests, as well as forested and unforested wetland areas. Portions of these areas are classified as “semi-improved,” which require periodic maintenance. Remaining forests, surface water, and wetlands are classified “unimproved” and are not maintained by the Air Force.

“Airfield” land use is the dominant category on the Base. It encompasses Runways 15/33 and 03/21, the taxiway network, the main parking ramp, and the clear zones at the end of each runway. The “aircraft operations and maintenance” land use is interdependent with the “airfield” land use and occurs in the area west of the main parking apron and along Bates Street. This land use includes the aircraft maintenance hangars, component repair shops, squadron operations buildings, base operations, passenger terminal, air freight terminal and other supporting facilities.

The industrial, administrative, community, medical, and housing uses are generally consolidated in other areas of the Base. Industrial land uses are consolidated in the northwest corner of the Base. Recreational areas are scattered along the northwestern portion of the Base. Athletic fields are located near the Proposed Action (Figure 3-7).

The land use near the Proposed Action is primarily industrial (Figure 3-8). The land use near the Third Alternative is runway/taxiway (Figure 3-9). Open space on the Base is mostly airfield borders, small timber stands, and drainageways.

## 3.10 Transportation Systems

There are two primary entrances to the Base – Rivers Gate and Dorchester Gate. The Rivers Gate is located on Arthur Drive northwest of the Runway 15 threshold. Arthur Drive provides the link between the Base and Interstate 26, the principal north-south corridor in the Charleston area. The main entrance is the Dorchester Gate, which is located at the western edge of the Base on Hill Boulevard at its intersection with Dorchester Road (State Highway 642). From the Rivers Gate, inbound traffic travels south until it intersects the Base's principal east-west artery, Hill Boulevard. Along the way, Arthur Drive distributes traffic onto other east-west streets, such as Stewart Avenue, Scott Street, and Simpson Street. Davis Drive and Graves Avenue provide alternate north-south routes within the developed area (AFCEE/Zapata Engineering P.A., 2002).

The principal interstate highways in the vicinity of Charleston AFB are Interstate 26 and Interstate 526, a beltway that loops to the Charleston metropolitan area from U.S. Highway 17 south of Charleston to U.S. Highway 17 north in Mount Pleasant. These two interstate highways intersect just southeast of the Air Force Base boundary. Local access from Interstate 26 is provided by Aviation Avenue, which extends westward from the interstate to Arthur Drive on the eastern side of the Base. Access to the community center and family housing area on the western side of the Base is provided by South Carolina Highway 642, known locally as Dorchester Road. North of the Base, Dorchester Road intersects Ashley Phosphate Road, a principal east-west artery that provides secondary access to Interstate 26.

## 3.11 Airspace/Airfield Operations

The 437<sup>th</sup> AW is the host unit at Charleston AFB and, together with the 315<sup>th</sup> AW, provides a large part of the AMC's Global Reach airlift capabilities. The mission of the 437<sup>th</sup> AW is to command assigned airlift and supporting units; provide for the airlift of troops and passengers, military equipment, mail, and aeromedical airlift; and participate in operations involving the air-land or air-drop of troops, equipment, and supplies when required. Apart from having a heavy air-drop commitment and a demanding humanitarian mission, Charleston AFB's mission requirements include supporting U.S. embassies, supplying humanitarian airlift relief to victims of disasters, and air-dropping troops into the heart of contingency operations in hostile areas.

In addition, the 16<sup>th</sup> Airlift Squadron was reactivated in July 2002, creating a fourth active-duty C-17 squadron for the Base. The mission is the same as the other C-17 squadrons.

### 3.11.1 Tenants

#### 3.11.1.1 315<sup>th</sup> Airlift Wing

The 315<sup>th</sup> AW is an Associate Reserve component and uses the C-17 and C-141B aircraft, facilities, and equipment of the host 437<sup>th</sup> AW for its training activities. These reservists directly support their active duty counterparts in operation and training, maintenance,

aerial port, civil engineering, personnel, and communications, as well as providing aeromedical evacuation capability. Under conditions of heightened tensions up to and including full mobilization, personnel of the 315<sup>th</sup> AW augment the 437<sup>th</sup> AW to ensure full use of the active wing's aircraft, maintenance, and aerial port facilities.

Composed of both full-time Air Reserve technicians and weekend reservists, the 315<sup>th</sup> AW's three maintenance squadrons are totally integrated with the 437<sup>th</sup> AW and perform one-third of the Base's aircraft maintenance workload. The four flying squadrons, the 300<sup>th</sup>, 317<sup>th</sup>, 707<sup>th</sup>, and 701<sup>st</sup> Airlift Squadrons, fly about 30 percent of the airlift missions. In addition, the 315<sup>th</sup> AW provides Charleston's only Aeromedical Squadron (AES), the 315<sup>th</sup> AES.

#### **3.11.1.2 1<sup>st</sup> Combat Camera Squadron**

Assigned to Charleston AFB by Headquarters, Air Combat Camera Service, the 1<sup>st</sup> Combat Camera Squadron is one of two combat documentary squadrons, and the only one assigned on the East Coast. Supported by five detachments, this squadron provides photographic and videography services to a wide range of DoD customers, including the operational commanders and the National Command Authority.

Consisting of photojournalists, videographers, equipment repair technicians, and support personnel, the squadron provides worldwide image-gathering and documentation services as directed by Headquarters.

#### **3.11.1.3 Other Tenants**

Additional tenant organizations are listed in Section 1.1.

## **3.12 Safety and Occupational Health**

### **3.12.1 Accident Potential Zones**

Air Force AICUZ land use guidelines include recommendations for clear zones and accident potential zones (APZs) I and II. The guidelines recommend land uses which are compatible with airfield operations yet allow the maximum beneficial use possible of adjacent properties. DoD APZs identify the area immediately beyond each end of the runway as the "Clear Zone," which is kept obstruction-free because of its high potential for accidents. APZs I and II are the areas beyond the clear zone and have a lower, yet still significant or measurable, potential for accidents. Land use in these areas must be compatible with the risk associated with the APZs.

Charleston AFB's AICUZ study was updated in February 2004. Each clear zone is a 3,000-foot by 3,000-foot imaginary surface at the end of each runway for a total of 826 acres (Figure 3-1). Within this area, accident potential is highest, so the necessary land use restrictions prohibit reasonable economic use of the land. At Charleston, about 600 acres within the clear zones are either owned by the Air Force outright or an easement allows the property to be used as a clear zone.

The APZs are shown on Figure 3-1. APZ I is less critical than the clear zone, but still has a significant risk factor. Land use compatibility guidelines for this 3,000-foot by

5,000-foot area are sufficiently flexible to allow reasonable economic use of the land; however, uses that concentrate people in small areas are not acceptable. APZ II is less critical than APZ I, yet still has potential for accidents. APZ II is 3,000 feet wide and 7,000 feet long, extending to 15,000 feet from the runway threshold. Acceptable uses include those allowed in APZ I and low density housing; high density uses, however, are not appropriate.

### **3.12.2 Occupational Health**

Currently, the 8-inch fuel transfer line extends through the CE complex and passes under a building. This is not considered an ideal condition and creates potential risks to workers at the CE complex.

Construction site safety and prevention of mishaps is an ongoing activity for any Air Force job site. Contracts for construction services include safety as a priority under standard terms and conditions. Areas of concern include compliance with regulations typical of construction projects, such as confined space regulations, minimum personal protection equipment standards (e.g., footwear, hardhats, eye protection), heavy equipment operation, and limited access to the area.

Additional safety considerations must be addressed due to the potential risk associated with working at an active airfield. The Air Force Safety Center (AFSC) develops and manages Air Force accident prevention programs. The AFSC Ground Safety Division develops ground safety programs and procedures to provide a safe work environment for Air Force personnel. They research, write, and maintain Air Force Occupational Safety and Health (AFOSH) standards to ensure compliance with federal laws. In addition, they evaluate final mishap reports and provide lessons learned and analyses to field units (AFSC, 2004).

Under certain conditions, AFOSH, USAF, and Federal Aviation Administration (FAA) safety regulations apply, in addition to OSHA regulations. These regulations address airfield issues such as equipment height restrictions, foreign object debris protection, and personnel/vehicle exclusion zones.

## **3.13 Environmental Management**

### **3.13.1 Pollution Prevention**

The Air Force Pollution Prevention program focuses on both the domestic and industrial component of the waste stream. Charleston AFB has a robust program to mandate industrial hazardous waste collection and recycling activities in the industrial portion of the Base as well as military family housing. The Proposed Action and the Third Alternative would not impact ongoing pollution prevention activities on Charleston AFB. Therefore, Pollution Prevention was eliminated as an issue warranting further analysis.

### 3.13.2 Soils

The Natural Resources Conservation Service (NRCS) completed the preliminary soils mapping of Charleston AFB in 1993. Table 3-5 lists the 15 soil types mapped at Charleston AFB (AFCEE/Zapata Engineering P.A., 2002). The surface soils are typically sand and sandy loam; clay content generally increases with depth. Permeability is relatively high in surface soils (6.0 to 20 inches per hour), but decreases with increasing clay content and depth (0.06 to 6.0 inches per hour). The increase in clay content and the decrease in permeability with depth cause rapid saturation of the sandy surface soils following rains. Figure 3-10 presents a map of soils located at Charleston AFB. Soils located near the Proposed Action are mainly Chipley fine sand, and soils near the Third Alternative are Udorthents sandy and loamy soils.

**TABLE 3-5**

Charleston Air Force Base Soils

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Charleston AFB Soils	Location
Chipley fine sand (0-2% slopes)	Proposed Action
Leon fine sand	Proposed Action
Udorthents sandy and loamy	Third Alternative
Williman loamy fine sand	Proposed Action

## 3.14 Environmental Justice

The Environmental Justice Policy, based on Executive Order (EO) 12898 of 1994, requires agencies to incorporate into NEPA documents an analysis of the environmental effects of their proposed programs on minorities and low-income populations and communities. The Proposed Action and Third Alternative are contained entirely on Charleston AFB property. No impacts are anticipated on minorities and low-income populations. Therefore, Environmental Justice was eliminated as an issue warranting further analysis.

## 3.15 Protection of Children from Environmental Health Risks and Safety Risks

NEPA analysis must demonstrate compliance with EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. Implementation of the Proposed Action or the Third Alternative would not present environmental health and safety risks to children on or off the Base. Military housing is located away from either location and no offbase residential housing is near the areas proposed for the Proposed Action and Third Alternative. Routine Air Force safety measures and procedures would extend to onbase housing and prevent environmental health and safety risks to children on the Base. The considered action alternatives would not pose environmental health risks or

safety risks to children. Therefore, Protection of Children from Environmental Health Risks and Safety Risks was eliminated as an issue warranting further analysis.

### **3.16 Indirect and Cumulative Impacts**

Indirect effects are defined by the CEQ in 40 CFR 1508.8 as those “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” Indirect effects are described throughout Section 4.

Cumulative impacts are defined by the CEQ in 40 CFR 1508.7 as “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions.” CEQ regulations require analysis of the cumulative impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these other actions.

Projects considered for cumulative impact in this EA are those that are ongoing or are planned to begin within the next 3 years. Projects planned to begin beyond that time horizon are too uncertain to be considered. Projects considered and cumulative impacts are described in Section 4.15.

### **3.17 Unavoidable Adverse Impacts**

No unavoidable adverse impacts have been identified and therefore this element was eliminated as an issue warranting further analysis.

### **3.18 Relationship between Short-term Uses and Enhancement of Long-term Productivity**

Pursuant to NEPA regulations (40 CFR 1502.16), an EA must consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Section 4.17 discusses this relationship.

### **3.19 Irreversible and Irretrievable Commitment of Resources**

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects the use of these resources will have on future generations. Section 4.18 addresses these impacts.

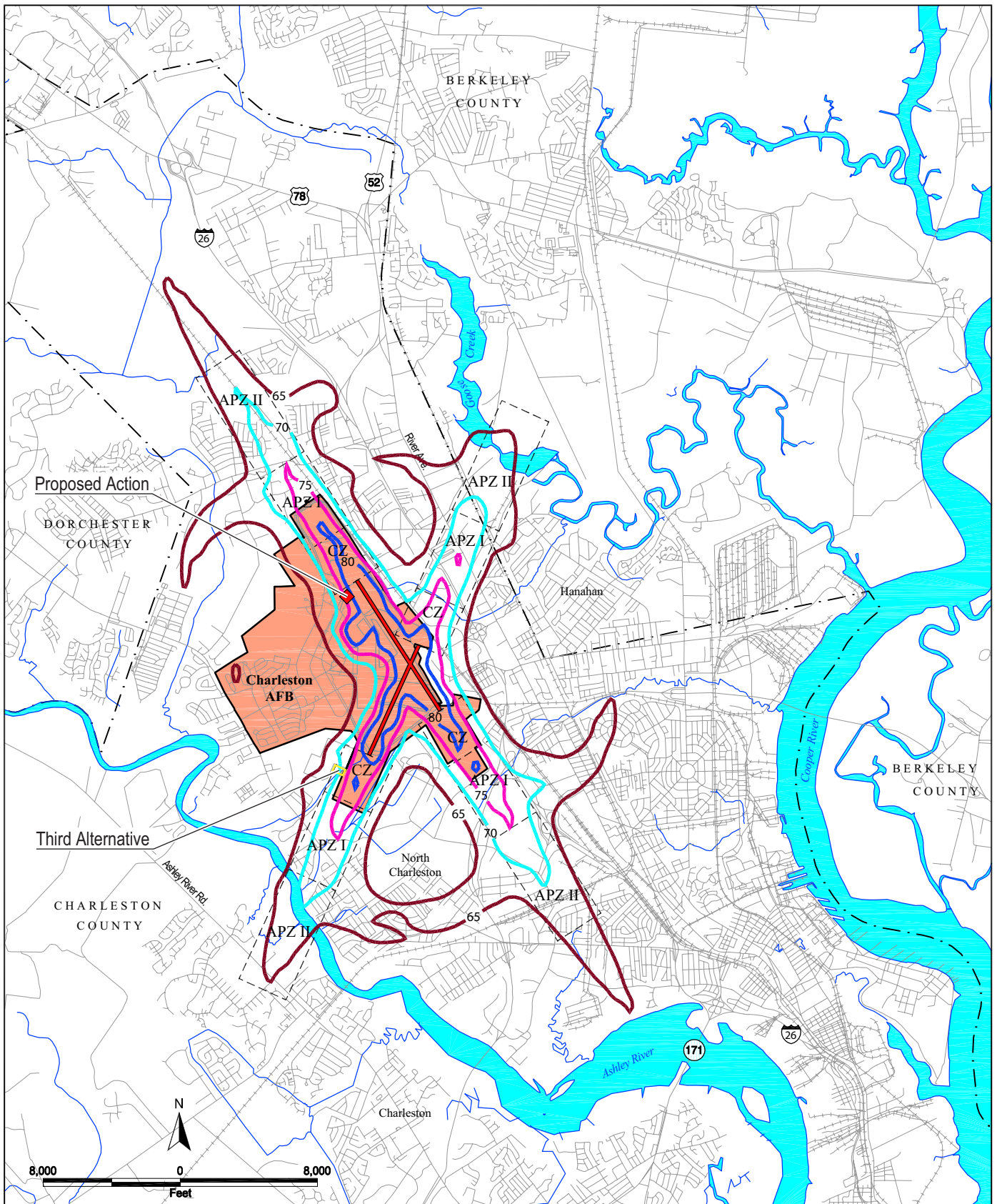
### **3.20 Coastal Zone Management**

The Coastal Zone Management Act (CZMA) of 1972 provides assistance to states, in cooperation with federal and local agencies, for developing land and water use

programs in coastal zones. Section 307 of the CZMA stipulates that federal projects that affect land uses, water uses, or coastal resources in a state's coastal zone must be consistent, to the maximum extent practicable, with the enforceable policies of that state's federally approved coastal zone management plan.

In 1977, the South Carolina Coastal Tidelands and Wetlands Act was passed, which gives the DHEC OCRM the duty to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone. OCRM's responsibility is to ensure that impacts to these resources are minimized (DHEC OCRM, 2004). OCRM's oversight applies to activities in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties.

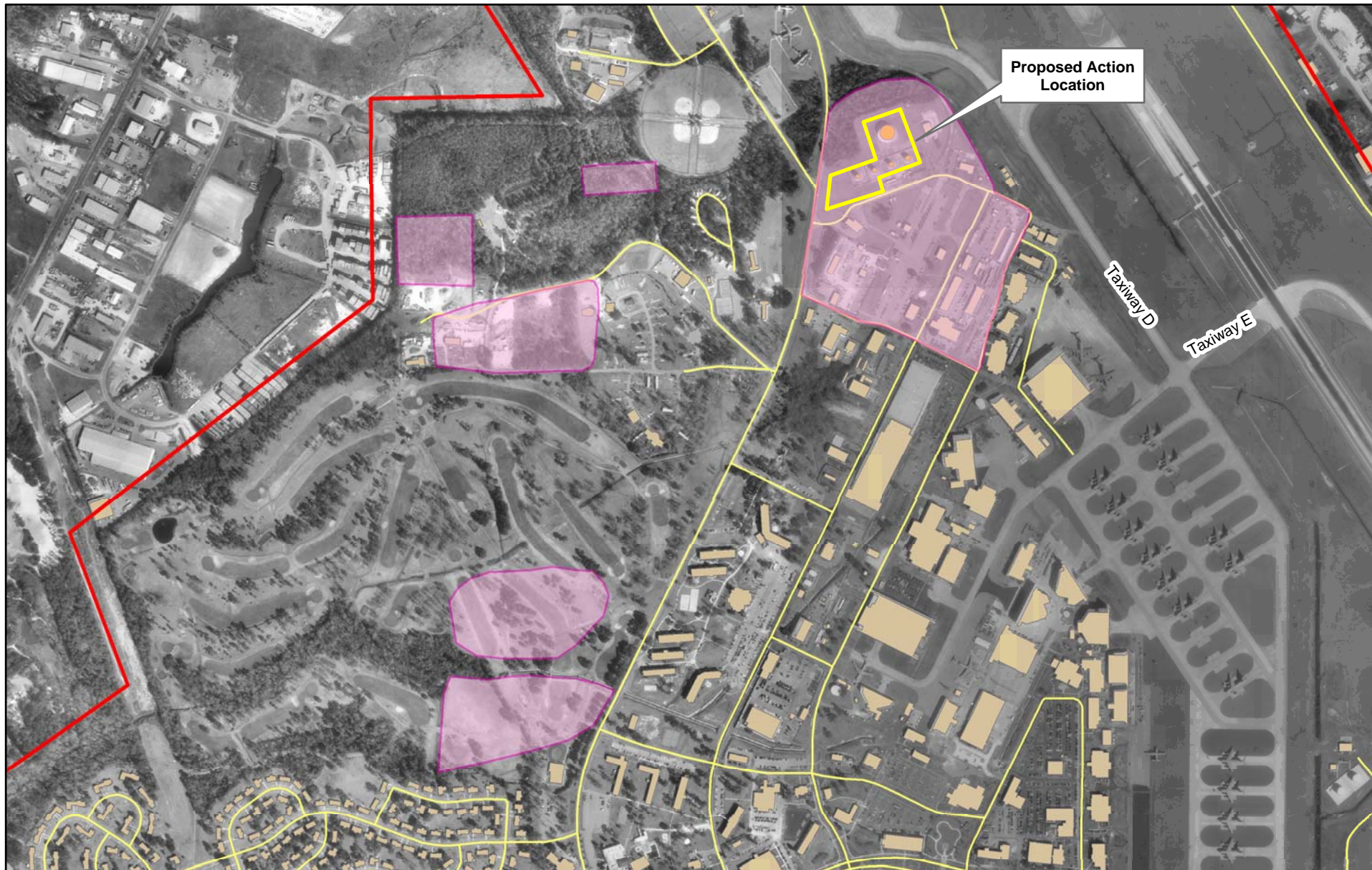
In South Carolina, the DHEC OCRM manages the state's coastal zone management program.



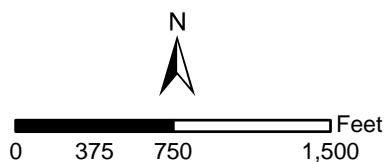
#### LEGEND

65 dBA Contour	CZ	Clear Zone	Charleston AFB
70 dBA Contour	APZ I	Accident Potential Zone I	Runway
75 dBA Contour	APZ II	Accident Potential Zone II	Roadway
80 dBA Contour			

**FIGURE 3-1**  
**NOISE CONTOURS AND AIR INSTALLATION COMPATIBLE USE ZONES**  
**FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT**  
**CHARLESTON AFB, SOUTH CAROLINA**



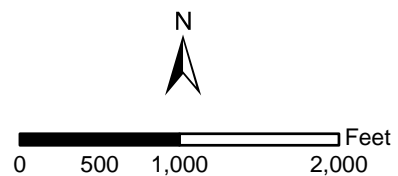
- Charleston AFB Boundary
- Roads
- Buildings
- Existing Fuel Tanks
- ERP Sites



**FIGURE 3-2**  
 ERP SITES NEAR THE PROPOSED ACTION  
*FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT*  
*CHARLESTON AFB, SOUTH CAROLINA*



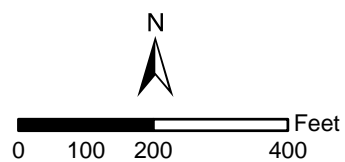
- Charleston AFB Boundary
- Roads
- Buildings
- ERP Sites



**FIGURE 3-3**  
 ERP SITES NEAR THE THIRD ALTERNATIVE  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



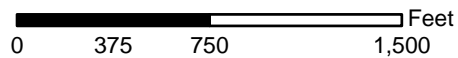
- Roads
- Existing Fuel Tanks
- Wetlands
- Buildings



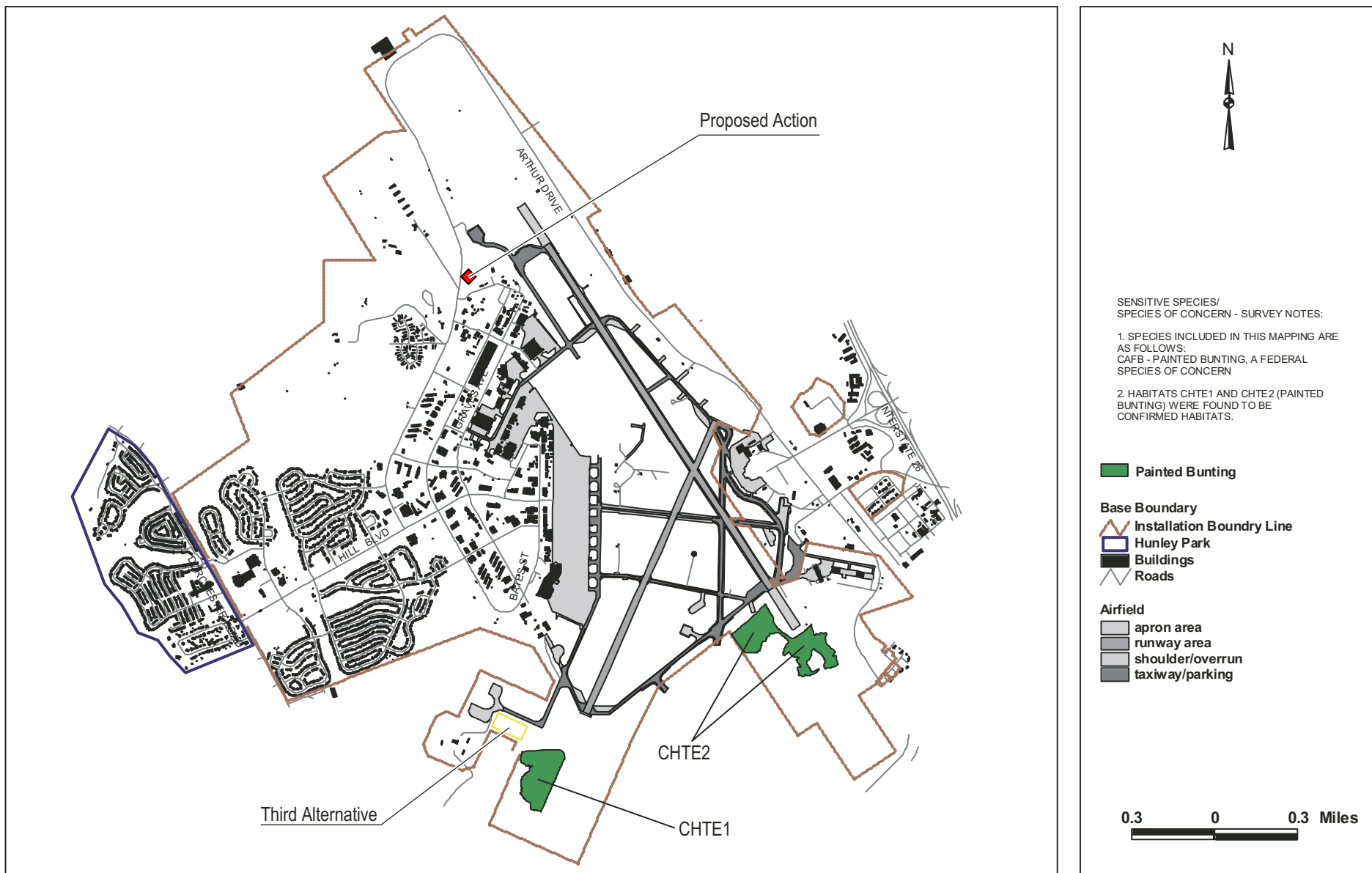
**FIGURE 3-4**  
**WETLANDS NEAR PROPOSED ACTION LOCATION**  
*FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT*  
*CHARLESTON AFB, SOUTH CAROLINA*



- Charleston AFB Boundary
- Roads
- Wetlands
- Buildings



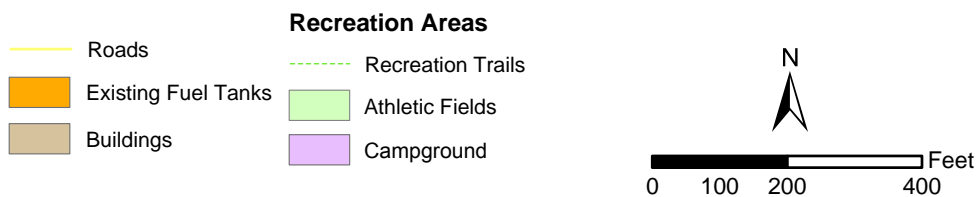
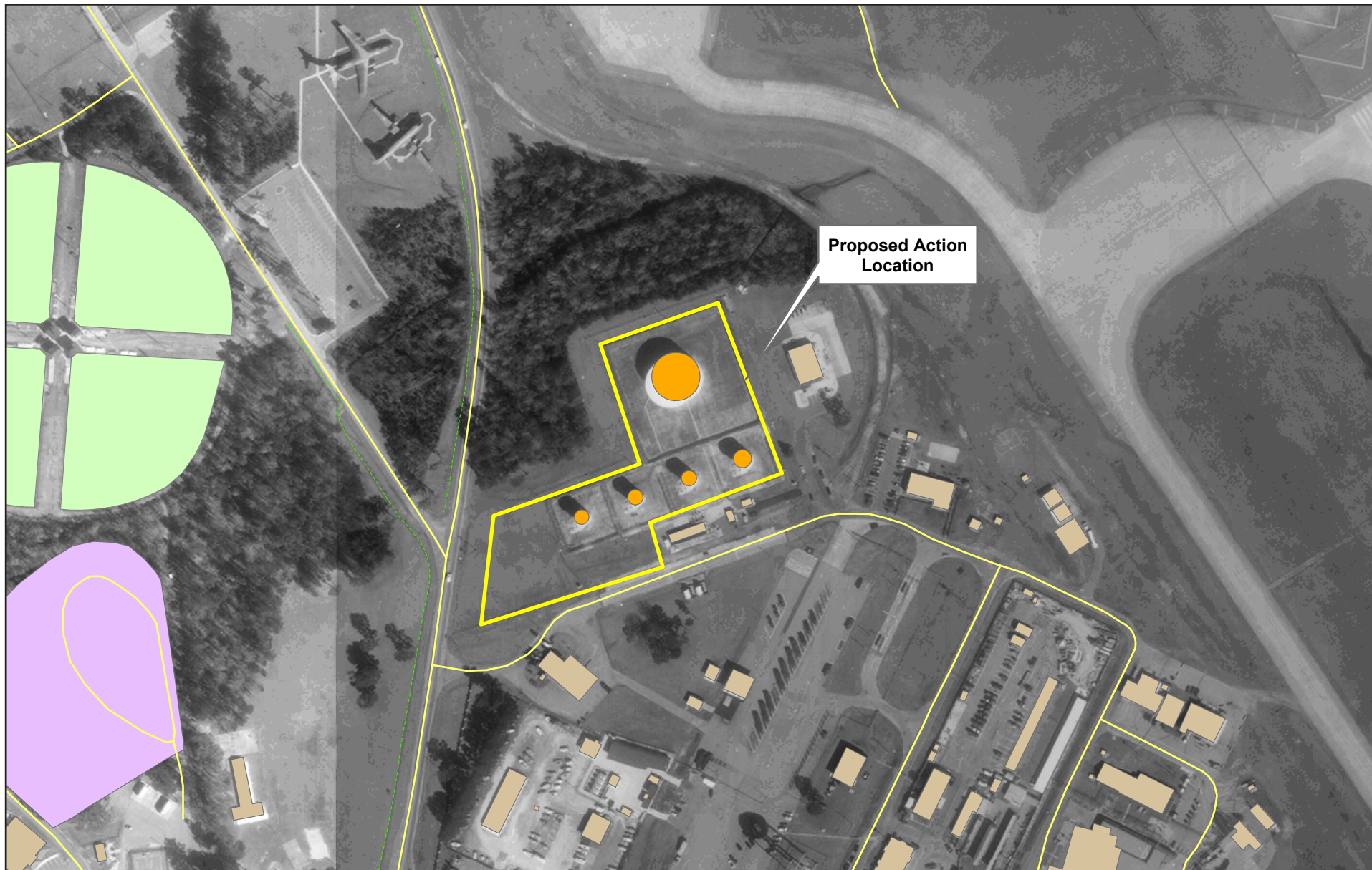
**FIGURE 3-5**  
**WETLANDS NEAR THIRD ALTERNATIVE LOCATION**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



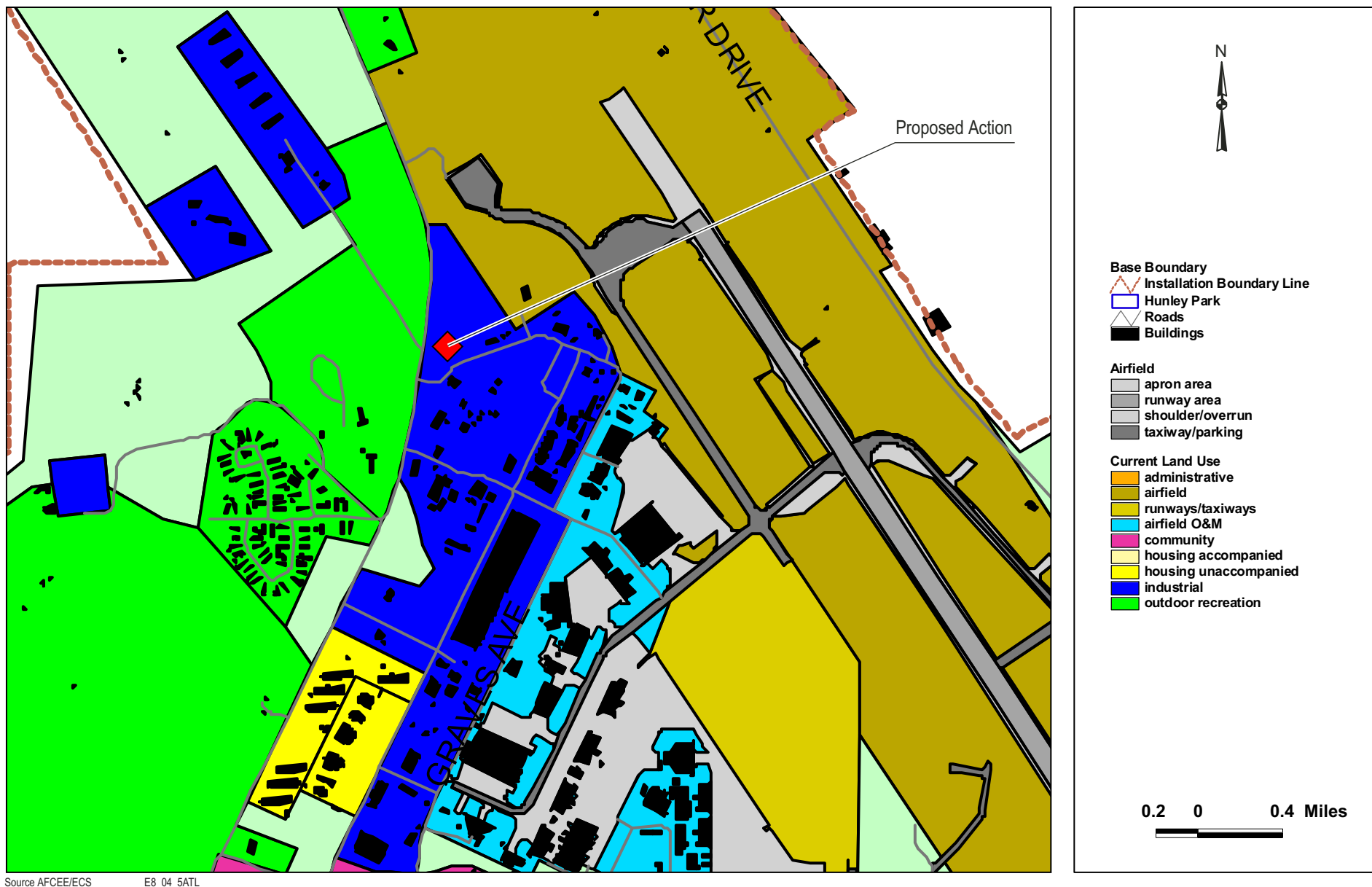
Source: AFCEE/ECS

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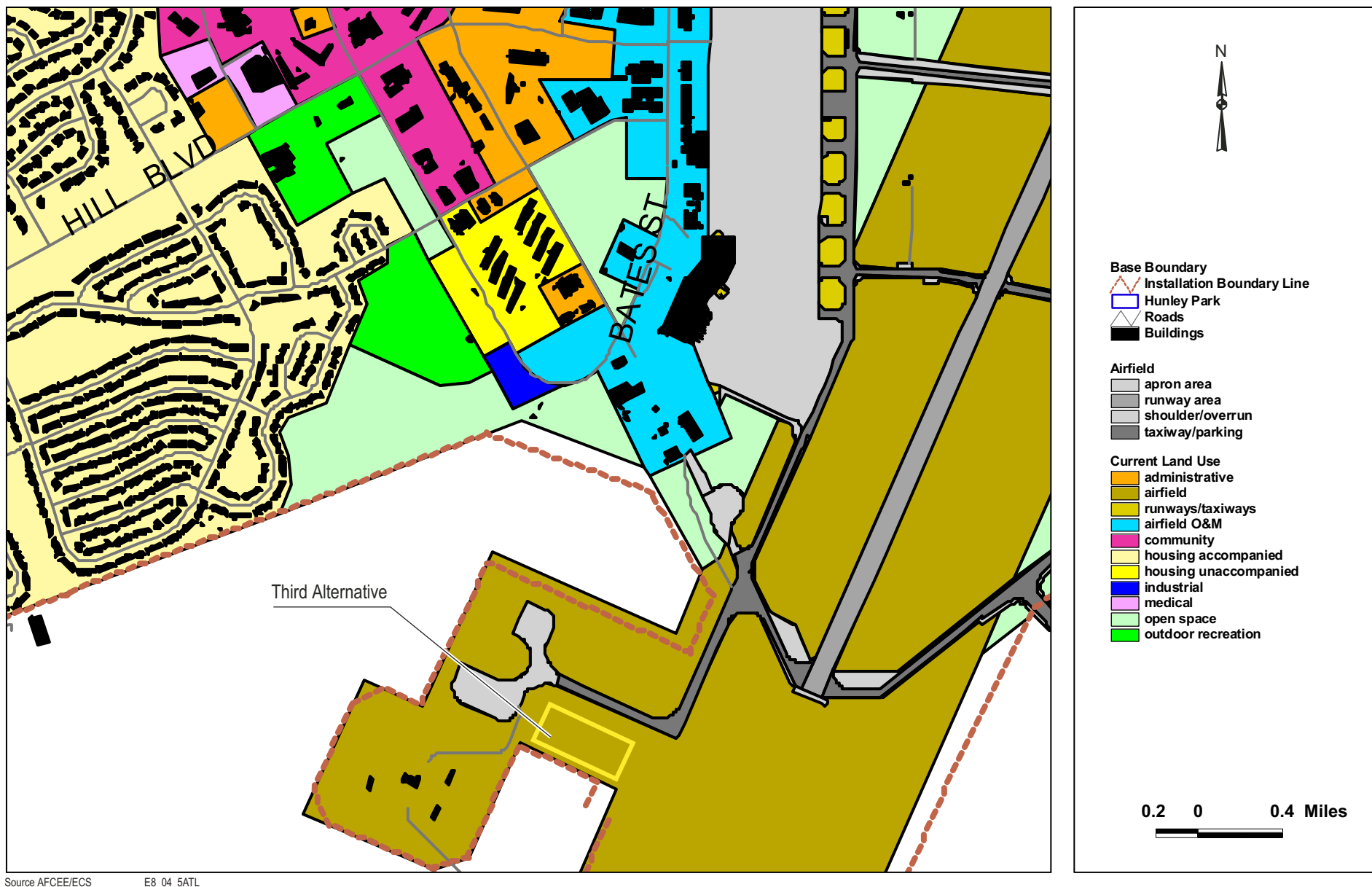
**FIGURE 3-6**  
SENSITIVE SPECIES HABITAT  
FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
CHARLESTON AFB, SOUTH CAROLINA



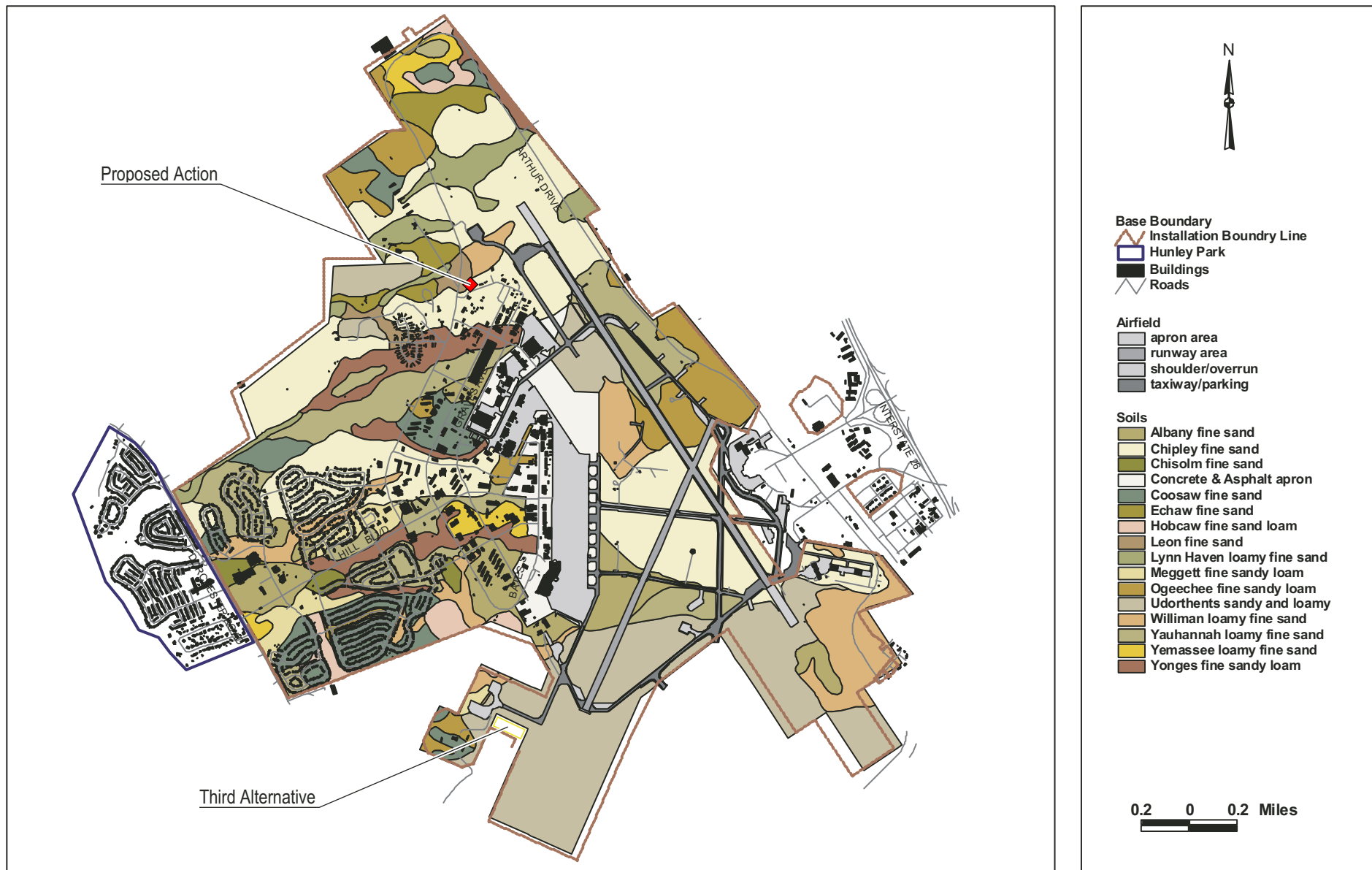
**FIGURE 3-7**  
 RECREATION AREAS NEAR PROPOSED ACTION LOCATION  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



**FIGURE 3-8**  
**LAND USE NEAR PROPOSED ACTION**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



**FIGURE 3-9**  
 LAND USE NEAR THIRD ALTERNATIVE LOCATION  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



Source AFCEE/ECS

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**FIGURE 3-10**  
**SOIL TYPES**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA

## 4.0 Environmental Consequences

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### 4.1 Introduction

The primary purpose of an EA is to identify potential impacts of major federal actions on the environment. The identification of potential impacts includes consideration of both the context and degree of the impact. When feasible, distinctions are made between short-term and long-term impacts and negligible/minor and adverse impacts. A negligible/minor impact may have an inconsequential effect or be unlikely to occur. An adverse impact would have negative consequences. If the current condition of a resource is improved or an undesirable impact is lessened, the impact is considered beneficial or positive. A “no impact” determination is made when the action does not noticeably affect a given resource from baseline conditions. Cumulative impacts are those that are likely to occur over a long period of time or as a result of combining the expected impacts of two or more unrelated actions.

This section evaluates the potential socioeconomic and environmental impacts associated with proposed demolition of four existing fuel tanks, abandonment of an existing fuel pipeline, and construction of two new fuel tanks and a new fuel pipeline.

The discussion below incorporates verbal comments from the Base as well as written comments received from AMC in the Comment and Response Matrix (Appendix D).

### 4.2 Air Quality

#### 4.2.1 Proposed Action

Charleston AFB is within an area in attainment for all criteria pollutants. Major new or modified stationary sources on and in the area of Charleston AFB are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant deterioration of air quality in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds: 100 or 250 tons/year based on the source’s industrial category (DHEC Bureau of Air Quality [BAQ], 2004). Each new tank would emit approximately 25 tons of VOCs per year (U.S. EPA, 1997). This is below the major source threshold. Thus, the Proposed Action would not result in a major new source. Should a spill occur after construction, there would be potential for additional volatilization from the containment area.

Construction activities under the Proposed Action would result in a limited generation of fugitive dust (particulate matter) and combustive emissions. Particulate matter would occur during demolition and excavation for tank and pipeline construction, but would be limited to normal working hours. Combustive emissions from trucks and construction equipment would be limited and generally occur in areas where sensitive receptors would not be present. It is anticipated that construction vehicles would use Arthur Drive

to enter and leave the Base. This route would minimize any air quality impacts on the general Base population and sensitive receptors. Appropriate BMPs would be implemented to limit fugitive dust. Impacts to air quality would be temporary and not significant.

Excavation for the tank system could expose volatile compounds in the ERP plume. This would be a temporary and minor impact on air quality. The presence of airborne release would be continually monitored and if concentrations were to exceed predefined action levels, construction activities would be halted until appropriate personal protection was donned, necessary BMPs adopted, and approved handling and decontamination procedures implemented to proceed safely.

#### **4.2.2 Third Alternative**

Impacts for this alternative would be similar to those of the Proposed Action. However, the closest gate to this alternative is the Dorchester Gate. Use of this gate by construction vehicles would result in an increased air quality impact on the main Base area and potential sensitive receptors.

#### **4.2.3 No-Action Alternative**

No air emissions impacts would result from the No-Action Alternative.

### **4.3 Noise**

#### **4.3.1 Proposed Action**

There are two potential sources of noise: equipment used for demolition and construction and aircraft activity. The Proposed Action requires the use of heavy equipment to remove the old tanks and containment structures and construct the new tanks and containment structures. Removal of the concrete containment pad under the existing tanks would require a howram excavator or similar equipment. This equipment typically emits noise at 80 to 105 dB, due to the high-frequency repetition of the cutting tool. Heavy equipment, including construction equipment, typically emits noise in the 86- to 94-dB range. The Proposed Action would be located between the 75- and 80-dB noise contours for the airfield (Figure 4-1). The combination of noise from equipment and the airfield would expose workers to continuous noise levels above 90 dB during the workday. Hearing protection would be required to prevent damage to workers' ears during construction.

There are limited potential receptors in proximity to the Proposed Action location. Base employees and contractors working in nearby buildings would be the most likely offsite receptors. However, the combination of distance from the proposed tank site and the sound insulation provided by the buildings would reduce the noise to levels well below those experienced by workers. Demolition and construction would increase noise levels intermittently and any nuisance noise would be temporary. There would be no risk of hearing impairment. Any impacts would be short-term and temporary.

Noise impacts would be minimized by limiting construction and demolition to regular working hours and shutting down idle equipment to reduce the aggregate noise level. Temporary sound baffles also could be used to reduce offsite noise levels. Workers would use proper hearing protection when needed to limit exposure to unsafe noise levels.

After construction, noise levels related to airfield operation would exceed the noise generated by operating the tanks. No cumulative increase in noise levels is expected.

### **4.3.2 Third Alternative**

The Third Alternative is located between the 70- and 75-dB noise contours (Figure 4-1). Construction impacts for this alternative would be similar to those of the Proposed Action. Demolition of four existing fuel storage tanks and spill containment areas would occur with this alternative, generating noise similar to that of the Proposed Action. The nearest building is 1,600 feet from the location of the alternative and noise impacts would not be a problem to Base personnel.

### **4.3.3 No-Action Alternative**

No noise impacts would result from the No-Action Alternative.

## **4.4 Wastes and Hazardous Materials**

### **4.4.1 Proposed Action**

#### **4.4.1.1 Solid Waste**

Under the Proposed Action, solid waste would be generated in the form of construction and demolition debris. The existing concrete containment slab under the tanks that would be removed is approximately 150 by 475 feet. Assuming the slab is 1-foot deep, the construction debris would amount to approximately 4,000 cubic yards. This material could be recycled for future construction projects or disposed of in a construction debris landfill. Other waste generated would be typical of a construction project. All of the solid waste could be contained in local sanitary landfills or C&D debris landfills as appropriate without threatening the capacity of those landfills. Excess surface clean soil from tank containment would be used as fill material on other projects as available. Any soil containing contamination would be disposed of in accordance with the Base procedures.

#### **4.4.1.2 Hazardous Materials**

AOC O lies under the location for the Proposed Action. As a result, contaminated soils may be encountered during construction. Elevated concentrations of gasoline constituents and JP-8 were detected in the soils underlying the tank farm. This contaminant would require continual monitoring during demolition and excavation activities during construction to prevent exposure of the workers to the potentially hazardous material. The construction crew would have a health and safety plan and a hazardous materials plan as reference documents in case contaminated soils were encountered. Appropriate health and safety steps would be required during construction to limit possible exposure

to vapors or contaminated soil. Any contaminated soil encountered during construction would be disposed of in accordance with Base procedures.

Demolition of the four existing tanks and abandonment of the existing fuel transfer line is not anticipated to generate hazardous waste. Residual petroleum in the tanks and pipeline for removal would be flushed, treated, if necessary, and recycled or disposed.

The DHEC Emergency Response Division performs spill prevention, control, and countermeasures (SPCC) inspections to confirm that facilities are in compliance with current requirements. The Division does not have specific regulations for aboveground oil storage tanks but follows Federal SPCC regulations (40 CFR, Part 112). An SPCC plan is required under 40 CFR Part 112. This regulation also requires that the containment area surrounding aboveground storage tanks hold 110% of the contents of the largest tank, plus freeboard for precipitation. Under this alternative, a containment area capable of holding 494,118 cubic feet would be required.

## **4.4.2 Third Alternative**

### **4.4.2.1 Solid Waste**

The Third Alternative would generate construction debris similar to that of the Proposed Action since the four small tanks and the spill containment area would be demolished. This material would require recycling and/or disposal. The Third Alternative would generate solid waste typical of a construction project. All of the solid waste could be contained in local landfills without threatening the capacity of those landfills.

### **4.4.2.2 Hazardous Waste**

There are no ERP sites or other hazardous waste issues associated with the Hot Cargo Zone. SPCC plans and containment structures would be similar to those implemented under the Proposed Action. As with the Proposed Action, there would be a potential to encounter contaminated soils.

## **4.4.3 No-Action Alternative**

The No-Action Alternative would not involve any new construction or demolition and therefore would generate no new solid or hazardous waste.

# **4.5 Water Resources**

## **4.5.1 Water Quality**

### **4.5.1.1 Proposed Action**

During construction, minor impacts to hydrology could result from land clearing, loss of vegetation, and potential increased volume of runoff following precipitation events. Increased site runoff could result in erosion and a potential flooding of the receiving streams. Appropriate BMPs would be implemented to minimize any impacts.

Demolition of tanks and cleaning of the pipeline to be abandoned in place could result in the accidental release of petroleum hydrocarbons. Residual petroleum would be collected and recycled as appropriate, or disposed of in accordance with standard procedures. All lines, tanks, and equipment would be cleaned and the rinsate collected, treated, and disposed of in accordance with approved procedures.

Impacts to water quality as a result of spills could occur during construction and post-construction. The Base stormwater management and SPCC plans would be implemented onsite and would prevent significant impacts to nearby streams and wetlands.

Once the containment system for the tanks is constructed, it would reduce the risk of future leaks or spills. The containment area for the two new tanks would include a berm and base with an impermeable layer capable of handling 110% of the volume of one of the tanks, plus freeboard for precipitation. This system would limit the impacts of a catastrophic tank failure.

#### **4.5.1.2 Third Alternative**

Impacts from the Third Alternative would be similar to those of the Proposed Action.

#### **4.5.1.3 No-Action Alternative**

Spills and catastrophic tank failures would remain risks for the existing tanks. Spill control and containment measures similar to those for the Proposed Action are in place.

### **4.5.2 Wetlands**

#### **4.5.2.1 Proposed Action**

The project would be designed to avoid impacts to wetlands under the Proposed Action.

#### **4.5.2.2 Third Alternative**

There would be no impacts to wetlands under the Third Alternative.

#### **4.5.2.3 No-Action Alternative**

There would be no impacts to wetlands under the No-Action Alternative.

## **4.6 Biological Resources**

### **4.6.1 Proposed Action**

Biological resources (plants and animals) and related habitats (foraging and nesting areas) may be directly affected by the Proposed Action due to construction and increased use of the area. Specifically, the Proposed Action would result in a conversion of approximately 0.5 acre of open land to fuel storage. The new containment area requires 98,840 square feet (2.27 acres) and the existing facility covers approximately 76,500 square feet (1.76 acres). Because this area is an actively maintained lawn area, any disturbance to vegetation and wildlife and vegetation would be minimal. No impacts to sensitive species (see Appendix C) would be expected.

## 4.6.2 Third Alternative

Biological resources (plants and animals) and related habitats (foraging and nesting areas) may be affected by the Third Alternative due to construction and increased use of the area. Because this area is a regularly cleared old field habitat, any disturbance to vegetation and wildlife should be minimal.

## 4.6.3 No-Action Alternative

Under the No-Action Alternative, there would be no impact to biological resources.

# 4.7 Socioeconomic Resource

## 4.7.1 Proposed Action

Construction of the Proposed Action would be conducted by contractors. Because the construction project is relatively small-scale, no long-term changes in offbase employment patterns would occur and no long-term impacts (positive or negative) would result. The Proposed Action would result in short-term benefits from construction-related employment.

## 4.7.2 Third Alternative

Benefits of the Third Alternative would be similar to those of the Proposed Action.

## 4.7.3 No-Action Alternative

Under the No-Action Alternative, no socioeconomic impact would result.

# 4.8 Land Use

## 4.8.1 Proposed Action

Most of the activity under the Proposed Action would occur within areas of Charleston AFB that are paved, maintained as lawn, occupied by existing fuel tanks, or otherwise disturbed. The Proposed Action would convert approximately 0.5 acre of open space and 1.75 acres of land supporting existing fuel tanks to new JP-8 fuel tanks and containment structures. Tables 4-1 and 4-2 list the containment volume required and resulting footprint sizes for the new tanks and containment areas. Additional information on tank sizing is presented in Appendix B.

**TABLE 4-1**

Required New Containment Area

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Parameter	Volume (cubic feet)
Tank Volume	449,197.9
Required Containment Volume <sup>a</sup>	494,117.6

<sup>a</sup> Required volume is 110% of largest tank size. Assumes that the containment area for the existing large tank is 100% of the volume and would remain intact.

**TABLE 4-2**

New Tank Area

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

<b>Volume (ft<sup>3</sup>)</b>	<b>Height (ft)</b>	<b>Surface Area (ft<sup>2</sup>)<sup>a</sup></b>
494,200	4	123,540
494,200	5	98,840
494,200	6	82,400
494,200	7	70,600
494,200	8	62,000

<sup>a</sup> Assumes 2:1 slopes for berms

The Proposed Action would be consistent with the Base General Plan and would not modify existing or future land use patterns on Charleston AFB. Construction of the Proposed Action would occur within areas presently used for fuel storage. Construction of a new fuel transport line would divert fuel pipelines away from existing buildings, allowing for greater flexibility with uses for those properties.

### 4.8.2 Third Alternative

Most of the activity under the Third Alternative would occur within areas of Charleston AFB that are already disturbed. Approximately 2.27 acres of primarily old field land would be converted to fuel storage. Any future uses of surrounding lands would have to be consistent with fuel storage.

### 4.8.3 No-Action Alternative

There would be no impacts to land use under the No-Action Alternative.

## 4.9 Transportation Systems

### 4.9.1 Proposed Action

The Proposed Action would require the relocation of an approximately 800-foot section of a Base road to the south of the existing tank field. In addition, temporary traffic impacts would occur along transportation corridors of trucks and equipment used in construction of the new facility and demolition and debris removal of the old facility.

Removal of the containment area under the existing four tanks that would be removed would generate approximately 4,000 cubic yards of material that could be compacted. Approximately 350 truckloads of debris related to the containment pad would need to be hauled away to a local C&D landfill for disposal or recycling. The trucks would cause a temporary impact due to increased local traffic during demolition and again during construction.

### 4.9.2 Third Alternative

Impacts during demolition of the tanks and containment area would be similar to those that would occur during the Proposed Action. Under the Third Alternative, there would

temporary traffic impacts along transportation corridors of trucks and equipment used in construction of the new facility.

### **4.9.3 No-Action Alternative**

There would be no impacts to the current transportation systems with the No-Action Alternative.

## **4.10 Airspace/Airfield Operations**

### **4.10.1 Proposed Action**

Charleston AFB's mission is to provide airlift capabilities as part of the AMC's Global Reach. The 437<sup>th</sup> AW is the host unit at Charleston AFB and, together with the 315<sup>th</sup> AW, provides a large part of the airlift role. The Base's refueling capability is a critical part of that role, which includes providing for the airlift of troops and passengers, military equipment, mail, and aeromedical airlift, as well as participation in operations involving the air-land or air-drop of troops, equipment, and supplies when required.

The Proposed Action would have a positive impact by providing adequate JP-8 fuel tanks and facilities for receiving fuel via pipeline or truck and transferring fuel to operational storage tanks near the flight line. This would allow Charleston AFB to fulfill its military mission. The Proposed Action would also reduce risk by rerouting current fuel transfer pipelines away from existing buildings.

During construction, Charleston AFB would manage fueling operations through three of the existing storage tanks (72,960-barrel, 6,050-barrel, and 4,050-barrel). The staff would schedule fuel delivery from the offbase depot and manage plane refueling to minimize shortages and resulting delays in operations as existing tanks are demolished and removed.

### **4.10.2 Third Alternative**

This alternative would provide upgraded fuel storage and transfer capacity similar to the Proposed Action. However, this alternative would result in the creation of a new fuel storage area near an area used to unload hazardous air cargo. This area is located within a Base explosive safety zone (Figure 4-2). The explosive risk would be a threat to stored fuel. This location would also require construction of a new fuel supply pipeline to fill the tanks.

### **4.10.3 No-Action Alternative**

The No-Action Alternative would limit the operations of the 437<sup>th</sup> and 315<sup>th</sup> AW by providing inadequate fuel supplies needed for their missions, including support of operations in Iraq and Afghanistan.

## **4.11 Safety and Occupational Health**

### **4.11.1 Proposed Action**

Potential safety and occupational health impacts would be related to construction activities at the site of the Proposed Action. Workers would follow OSHA and Air Force standards and procedures as applicable. The contractors would be responsible for ensuring that all contractor employees (and subcontractors) comply with all applicable OSHA standards. There would be no impacts to the safety and occupational health of workers or other persons in the area of the Proposed Action.

Abandoning the existing 8-inch fuel delivery line would improve safety for the occupants of the CE complex. The existing line would no longer be in service and fuel would no longer flow under the complex.

The Proposed Action is located approximately 1,500 feet from the runway, outside of the clear zone, but within APZ I. By locating the new facility in the area where similar tanks are located, no additional safety risks would be created.

### **4.11.2 Third Alternative**

The Third Alternative would create a new area of potentially hazardous petroleum storage near an area used to load hazardous cargo. The site for the Third Alternative is within APZ I, and the eastern edge of this site is within the clear zone for one of the runways. As discussed above, the site is within the explosive safety arcs. Locating fuel storage tanks in this area would present a significant additional safety risk for the Base.

Impacts from abandoning the 8-inch fuel delivery system would be similar to those of the Proposed Action. Construction-related safety and occupational health impacts would be similar to those of the Proposed Action.

### **4.11.3 No-Action Alternative**

The No-Action Alternative would not create any safety and occupational health concerns.

## **4.12 Environmental Management: Geology and Soils**

### **4.12.1.1 Proposed Action**

Excavation and preparation of the tank site and containment would disturb surface soils. The tank containment area would permanently cover 2.27 acres of soil. Soils would be compacted or replaced with more suitable substrate material. However, impacts to soil during tank operation are expected to be negligible for berm and foundation construction. Soils would be excavated for the pipeline trench.

Implementation of appropriate BMPs, consistent with the South Carolina water quality regulations (DHEC, 2003), would prevent excessive loss of soils during construction. BMPs that would be implemented may include:

- Straw bale dikes
- Silt fences
- Temporary sediment traps
- Seeding

Additionally, Charleston AFB is developing an erosion control database to assist with land management. The database would document erosion problems, maintain information regarding those problems, identify possible measures to control erosion problems and/or measures implemented, and record development following implementation of control measures. This database would enhance the Base's ability to respond to future erosion problems by maintaining a permanent record of actions and results.

#### **4.12.1.2 Third Alternative**

Impacts from the Third Alternative would be similar to those of the Proposed Action.

#### **4.12.1.3 No-Action Alternative**

No soil disturbance would result from implementation of the No-Action Alternative.

### **4.13 Indirect and Cumulative Impacts**

The potential for cumulative impacts to the environment from the Proposed Action was evaluated in terms of known future projects at Charleston AFB that have the potential to affect the same environmental resources as the Proposed Action and potential future development in the Charleston area that could impact these resources. No major construction projects of a scale that would contribute to cumulative effects in conjunction with the Proposed Action are planned.

#### **4.13.1 Air Quality**

Under the Proposed Action and the Third Alternative, approximately 25 tons of VOCs per year per tank would be emitted, based on bulk storage tank emission levels developed by U.S. EPA (1997). The bulk storage tanks are the largest source of VOCs on Charleston AFB and no new sources of VOCs are planned for construction in the foreseeable future. This level of emissions would not result in deterioration of air quality on the Base or in the region. It is likely that future advances in emission control technology for bulk storage tanks will occur and that the tanks at the Base would be equipped with new technology to further reduce incidental emissions from stored fuel. For the reasons discussed above, no cumulative or indirect impacts to air quality would be expected from fuel tanks under the Proposed Action or the Third Alternative.

Added fuel capacity would allow for a future increase in the number of flights handled by Charleston AFB. Aircraft are considered mobile sources and are not covered by a Title V permit. An increase in air traffic would result in increased emissions of VOCs, carbon monoxide, oxides of nitrogen, particulates, and sulfur dioxide (U.S. EPA, 1999). These increased emissions would be tracked by the State of South Carolina and be accounted for in the total inventory of pollutants for the region. However, cumulative or indirect impacts resulting from additional air traffic would be considered minor and short-term.

No air quality impacts or changes in existing conditions would occur if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to air quality would result from the No-Action Alternative.

#### **4.13.2 Noise**

Operation of the fuel delivery system would not generate noise above the background noise in this part of the Base. The Proposed Action would be located between the 75- and 80-dB contours of the airfield and the Third Alternative would be located between the 70- and 75-dB contours. Because the noise of the fuel delivery system would be below background levels, no cumulative or indirect impacts from noise would result from either the Proposed Action or the Third Alternative. An increase in the number of flights handled by Charleston AFB could occur as a result of improved fueling operations. This could result in an indirect noise impact. However, the current operational guidelines would be followed, thereby minimizing those impacts.

No noise impacts or changes in existing conditions would occur if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to noise would result from the No-Action Alternative.

#### **4.13.3 Wastes and Hazardous Materials**

Significant cumulative impacts relating to wastes, hazardous materials, and stored fuels are not expected under the Proposed Action or the Third Alternative. No hazardous materials would be generated from demolition of the existing storage tanks and fuel delivery line. Those components would be drained and cleaned prior to decommissioning and disposal. During fueling operations, the impacts would remain the same as with current operations. Only minimal waste material would be generated from required maintenance activities, and this waste could be disposed of without adversely impacting local landfills.

There would be no change in existing conditions and no impacts to wastes, hazardous materials, and stored fuels if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to wastes, hazardous materials, and stored fuels would result from the No-Action Alternative. However, the limited fuel supply would continue to constrain the ability of Charleston AFB to meet its military mission.

#### **4.13.4 Water Resources**

Any future projects on Charleston AFB or in the greater Charleston community that would impact wetlands or other waters of the United States would be required to obtain CWA Section 404 permits and CWA Section 401 Water Quality Certification. These regulatory processes are in place to assure that proposed projects do not individually or cumulatively affect wetlands or other waters of the United States. Additionally, projects that would have the potential to adversely impact water quality would be required to obtain CWA NPDES discharge or stormwater discharge permits. These programs, which are administered by the State of South Carolina, are designed to protect the quality of the waters within the state. Because of the permitting requirements discussed above, no cumulative or indirect impacts to water resources would result from either of the considered action alternatives.

There would be no change in existing conditions and no water resource impacts if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to water resources would result from the No-Action Alternative.

#### **4.13.5 Biological Resources**

The Proposed Action would be sited within an area currently maintained as maintained lawn. This area provides very minimal value to biological resources. Displacement of animals in nearby habitats may occur during construction, but this impact would be temporary and minor. No cumulative or indirect impacts to biological resources are expected.

The Third Alternative would be located within an old field area that is cleared regularly. This area provides greater biological resource value than the site for the Proposed Action, but the general biological value also is low. The Third Alternative is located adjacent to painted bunting habitat (CHTE1). No record of the painted bunting was found for the location of the Third Alternative. However, the potential does exist for a minor impact to the painted bunting with the removal of the forested area. Loss of the old field area would not be expected to result in significant cumulative or indirect impacts to other biological resources. Implementation of the Third Alternative would have similar temporary construction impacts as those described for the Proposed Action.

There would be no change in existing conditions and no biological resource impacts if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to biological resources would result from the No-Action Alternative.

#### **4.13.6 Socioeconomic Resources**

Minor positive indirect impacts to the local economy would result from either the Proposed Action or the Third Alternative. Purchase of materials from local suppliers and spending of wages in local businesses would benefit the local economy in the short term. However, once construction is complete, no other socioeconomic impacts would occur. Therefore, no cumulative impacts to socioeconomic resources would occur and only minor short-term indirect positive economic benefits would result.

No socioeconomic resource impacts or changes in existing conditions would occur if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to socioeconomic resources would result from the No-Action Alternative.

#### **4.13.7 Land Use**

The Proposed Action is located within an area designated for airfield operations and maintenance. Implementation of the Proposed Action is consistent with that use, and no cumulative or indirect impacts to land use would result as no change in land use would occur. The Third Alternative is located in an area that is designated as runway/taxiway but is offline with runways/taxiways used during general airfield operations. The area is used for staging and handling hot cargo. Implementation of the Third Alternative would result in a change of use for a portion of the area designated runway/taxiway, but no disruption of hot cargo handling would occur. This minor change in land use would not have any cumulative or indirect impacts on land use on Charleston AFB.

There would be no change in existing conditions and no land use impacts if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to land use would result from the No-Action Alternative.

#### **4.13.8 Transportation Systems**

Implementation of the Proposed Action or the Third Alternative would not result in changes to traffic flow and only minor impacts would result from traffic congestion during construction. Therefore, no cumulative or indirect impacts to transportation systems are expected.

No transportation system impacts or changes to existing conditions would occur if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to transportation systems would result from the No-Action Alternative.

#### **4.13.9 Airspace/Airfield Operations**

Implementation of the Proposed Action or the Third Alternative would increase the fuel supply on Charleston AFB and allow airfield operations the capability to increase the number of flights handled by Charleston AFB. This would constitute a cumulative positive impact on the Base's military mission. Additional fuel storage would allow the Base to expand its mission to support military operations as needed.

There would be no change in existing conditions if the No-Action Alternative were implemented. Therefore, airfield operations would continue to be constrained by limited fuel supply and the Base would continue to be limited in its ability to meet its military mission in support of required operations.

#### **4.13.10 Safety and Occupational Health**

The activities associated with the Proposed Action would improve the long-term safety of Base personnel, especially those occupying the CE complex. This indirect impact would result from the relocation of the fuel delivery line. The new fuel storage tanks would be located in an area already used for bulk fuel storage and would not create new safety risks. No cumulative or indirect impacts to safety and occupational health are expected from construction of the new storage tanks.

The Third Alternative would create a new petroleum storage site near an area used to load hazardous cargo. As discussed above, the Third Alternative site is within the explosive safety arcs. Locating fuel storage tanks in this area would present a significant additional safety risk for the Base, as the fuel tanks could be compromised by an accident in the Hot Cargo Zone.

There would be no change in existing conditions and no safety and occupational health impacts if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to safety and occupational health would result from the No-Action Alternative.

#### **4.13.11 Geology and Soils**

Following construction of the Proposed Action or the Third Alternative, no additional impacts to soils would occur. Because of the limited area that would be disturbed for either alternative, no cumulative impacts to geology or soils are expected.

Should contaminated soils be encountered beneath the Proposed Action site, removal, remediation, and disposal of this contaminated soil could provide a positive indirect impact to Base soils through removal of a potential source of additional contamination.

There would be no change in existing conditions and no impacts to geology and soils if the No-Action Alternative were implemented. Therefore, no cumulative or indirect impacts to geology and soils would result from the No-Action Alternative.

### **4.14 Unavoidable Adverse Impacts**

This EA has identified no unavoidable adverse impacts from the Proposed Action.

Under the Proposed Action, temporary and/or minor impacts may occur in the following resource areas:

- Air quality
- Noise
- Solid waste
- Water quality
- Transportation systems

Impacts to these resources would be temporary and/or minor through implementation of BMPs and other suitable controls.

### **4.15 Relationship between Short-term Uses and Enhancement of Long-term Productivity**

Short-term uses of the local environment include direct demolition- and construction-related disturbances and direct impacts associated with an increase in population and activities that occur in less than 5 years. Long-term uses of the local environment include those occurring over a period of more than 5 years, including permanent resource loss. Several kinds of activities can result in short-term resource uses that compromise long-term productivity. Wetland loss, loss of other important habitats, or consumptive uses of non-renewable resources are examples of actions that affect long-term productivity.

No important natural resources are associated with the proposed demolition and construction in the Proposed Action. No long-term impact on resources at Charleston AFB would occur.

The Proposed Action assumes levels of activity that would produce some impacts on certain resource areas, but these are short-term. No adverse impacts on the maintenance and enhancement of long-term productivity are expected. Additional fuel storage

capacity would allow the Base to expand its mission to support military operations, enhancing long-term productivity on the Base.

## 4.16 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species).

All demolitions at USAF facilities must be conducted in compliance with the *Construction and Demolition Waste Management Pocket Guide* (USAF, 2000). The purpose of the guide is to outline the steps required in tracking and diverting the C&D portion of the solid waste stream. C&D waste material would be generated under both the Proposed Action and the Third Alternative.

The Air Force has issued a Non-hazardous Solid Waste Diversion Rate Measure of Merit letter that establishes policy for diverting non-hazardous solid waste from disposal in landfills and incinerators. Specifically, the letter requires that by the end of FY 2005, approximately 40 percent or more of non-hazardous waste be diverted from landfills or incinerators. In addition, the diversion must provide an economic benefit compared with disposal in a landfill or incinerator.

This process will require that a portion of the demolition materials be recycled, thereby reducing the amount of irreversible and irretrievable commitment of resources.

## 4.17 Coastal Zone Management

Charleston AFB is located within the identified coastal zone of South Carolina. Before any state or federal permit can be issued for a project in the coastal zone, the DHEC OCRM must review the project to confirm that it is consistent with the state coastal management policy and issue a Coastal Zone Consistency Certification (DHEC OCRM, 2004).

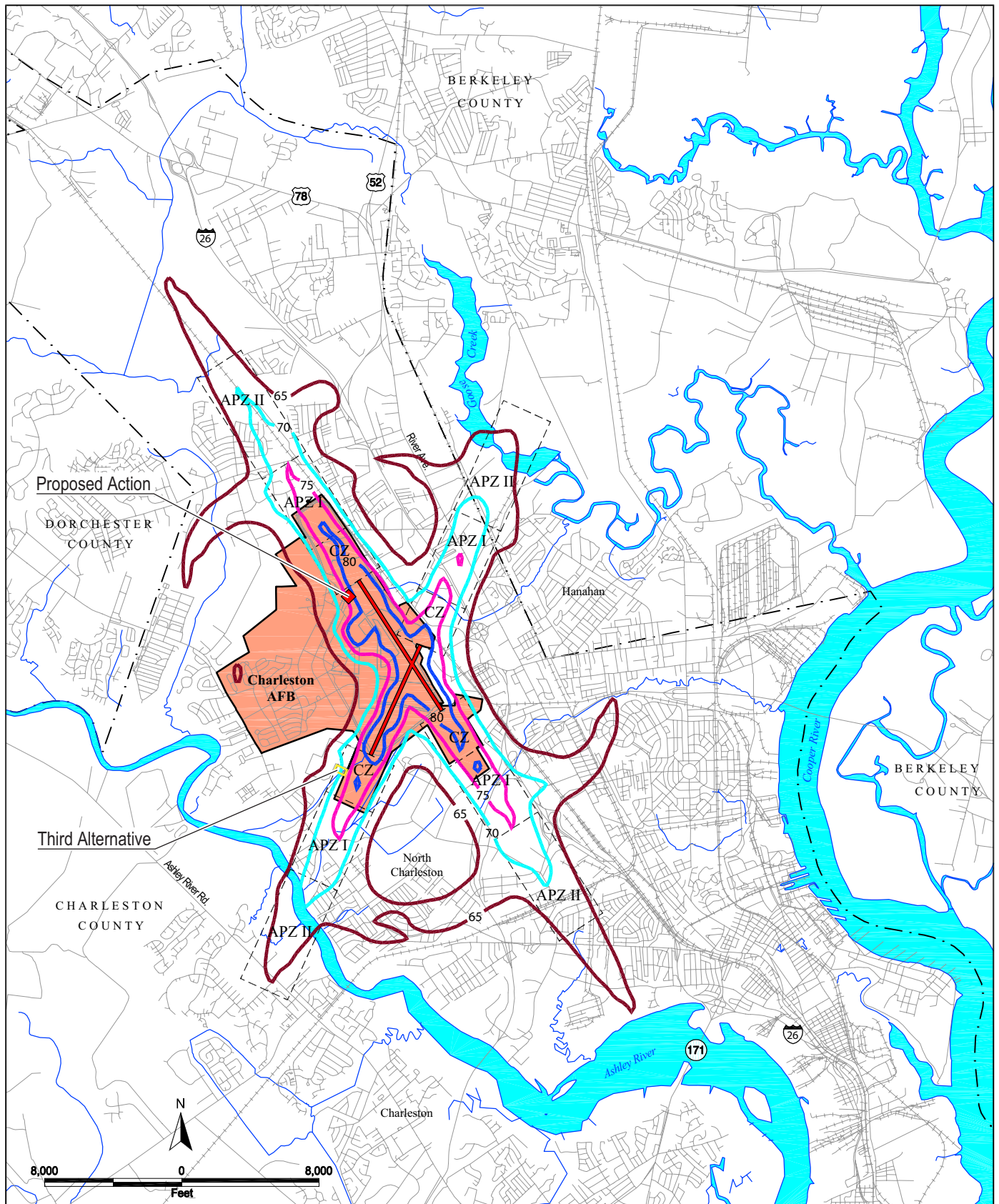
OCRM requires an approved stormwater management permit and submission of the following forms before construction/land disturbance begins:

- Standard Application Form for Construction Sites Sediment and Erosion Control
- Stormwater Application Checklist
- Initiation of Construction Form

During and after construction, OCRM requires the following:

- Stormwater Management and Sediment Reduction Site Inspection Form
- Final Site Inspection Request

The new fuel tanks will also need to be incorporated into the Base's NPDES SWP3 (stormwater pollution prevention plan) permit.

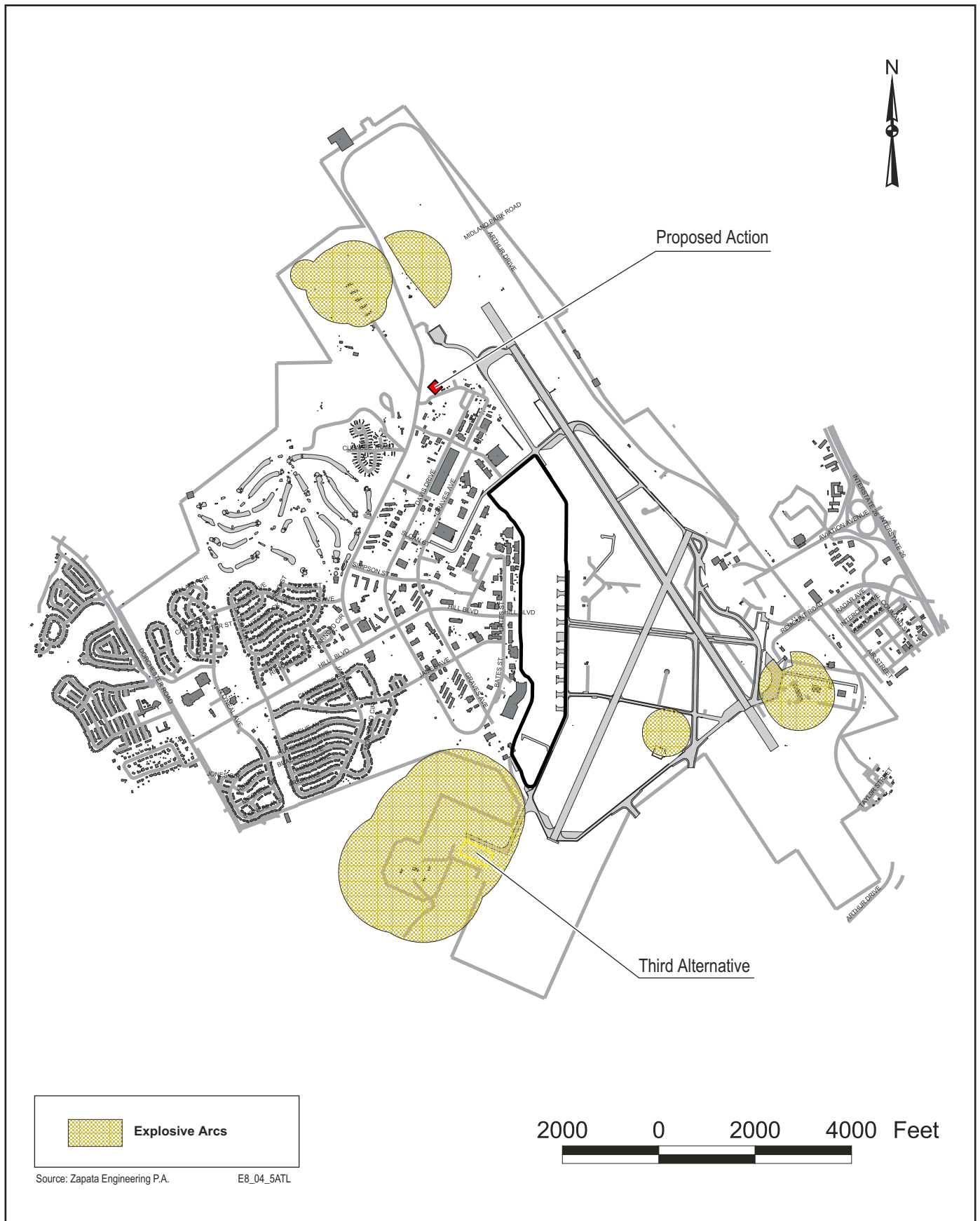


#### LEGEND

65 dBA Contour	CZ	Clear Zone	Charleston AFB
70 dBA Contour	APZ I	Accident Potential Zone I	Runway
75 dBA Contour	APZ II	Accident Potential Zone II	Roadway
80 dBA Contour			

E8\_04\_5ATL

**FIGURE 4-1**  
**NOISE CONTOURS FOR CHARLESTON AFB AIRFIELD**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA



**FIGURE 4-2**  
**EXPLOSIVE SAFETY ZONES**  
 FUEL STORAGE TANK REMOVAL AND REPLACEMENT ENVIRONMENTAL ASSESSMENT  
 CHARLESTON AFB, SOUTH CAROLINA

## 5.0 List of Preparers

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**Russell Short**/Senior Project Manager/28 years of experience/Master of Arts

**Rich Reaves**/Environmental Scientist/9 years of experience/Ph.D.

**Robert Price**/Environmental Scientist/9 years of experience/Master of Science

**David Dunagan**/Technical Editor/26 years of experience/Master of Arts

## 6.0 List of Contacts

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Charleston AFB personnel contacted:

Mr. Al Urrutia

Mr. Joe Camp

Lt. Eric Hagenburger

CM Sgt. John Adams

SM Sgt. Samuel Bellamy

AMC Headquarters personnel contacted:

Ms. Sharon Geil

Mr. Mark Fetzer

# 7.0 References

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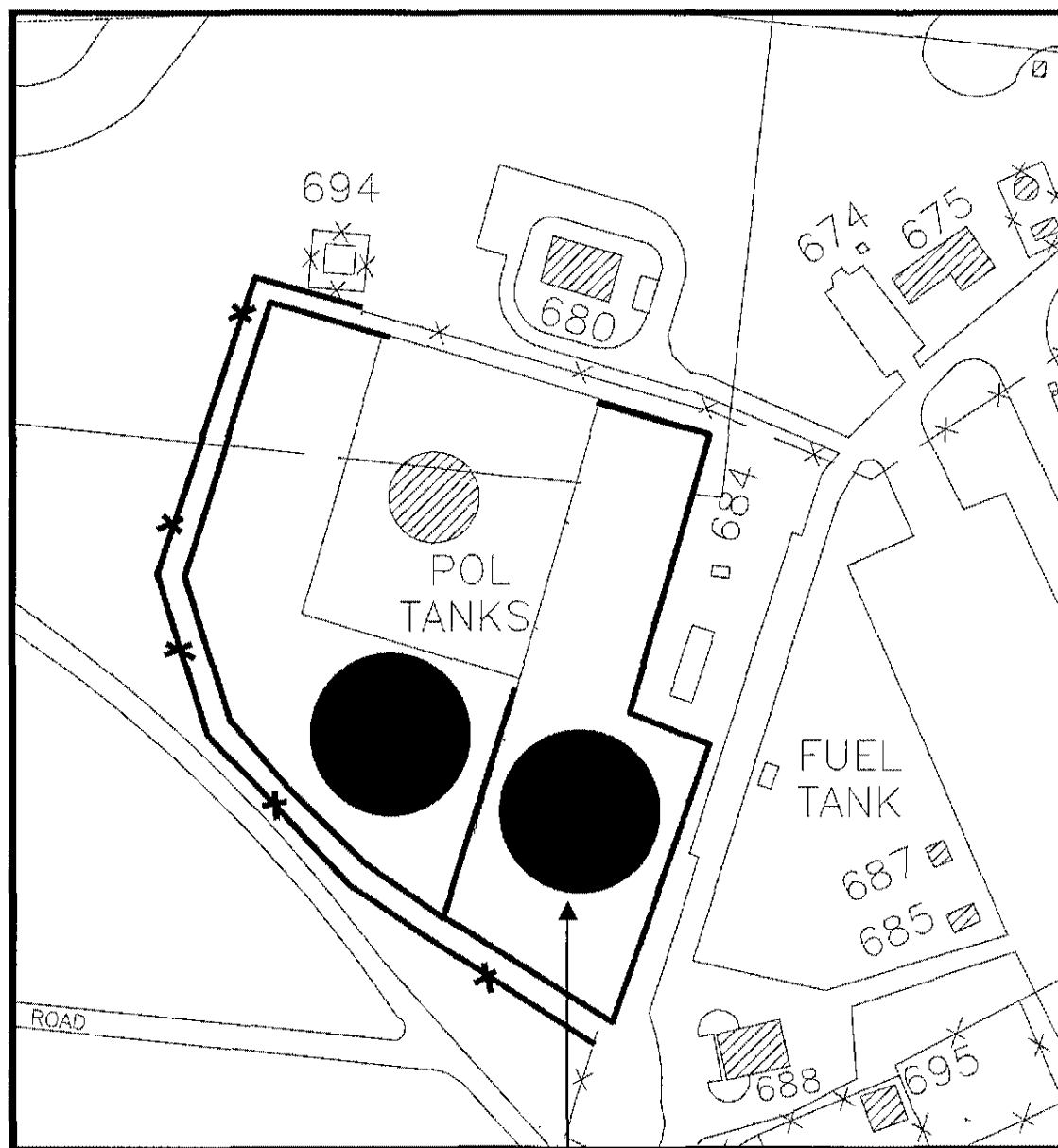
## **Appendix A**

### **Air Force Form 813**

Date	6/22	# of pages	4	
To	ANDREW CHARTRAN		From	KEITH THOMPSON
Co. Dept			Co.	
Phone #			Phone #	8439634024
Fax #	713 462 0165		Fax #	

PRELIMINARY ENVIRONMENTAL IMPACT ANALYSIS		Report Control Symbol RCS: 02-10			
INSTRUCTIONS: Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).					
<b>SECTION I - PROPONENT INFORMATION</b>					
1. TO (Environmental Planning Function) 437 CES/CEV	2. FROM (Proponent organization and functional address) 437 CES/CECP	2a. TELEPHONE NO. DSN 673-3943			
3. TITLE OF PROPOSED ACTION DKFX07-1007; Construct Two 80 Mbbl Bulk Fuel Tanks					
4. PURPOSE AND NEED FOR ACTION (Identify decision to be made and need date) Provide required bulk fuel storage capacity that will keep mission critical aircraft operational during fuel deliver shortages. Existing bulk storage is inadequate to support large aircraft flying out of Charleston AFB supporting contingency requirements or wartime OPLAN tasking. Date: 28 May 02					
5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPAA) (Provide sufficient details for evaluation of the total action.) Construct two steel AG JP-8 fuel tanks with 80,000 bbl capacity, on reinforced concrete, with rigid roof, floating internal pan, automatic tank gauging, associated dikes, lighting, and fencing. Demolition will include four 5 mbbl tanks for placement of one 80 mbbl fuel tank. ALTERNATIVES: 1) Status Quo 2) Construct Bulk Storage Tanks					
6. PROPONENT APPROVAL (Name and Grade) JASON WYEN, 2Lt, USAF 437 CES/CECP (Program Development)	6a. SIGNATURE <b>Jason Wyen</b>		6b. DATE 13 May 02		
<b>SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY.</b> (Check appropriate box and describe potential effects including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U = unknown effect)					
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE (Noise, accident potential, encroachment, etc.)		+	0	-	U
8. AIR QUALITY (Emissions, attainment status, state implementation plan, etc.)				X	
9. WATER RESOURCES (Quality, quantity, source, etc.)			X		
10. SAFETY AND OCCUPATIONAL HEALTH (Asbestos/radiation/chemical exposure, explosive safety quantity/distance, etc.)			X		
11. HAZARDOUS MATERIALS/WASTE (Use/storage/generation, solid waste, etc.)				X	
12. BIOLOGICAL RESOURCES (Wetlands/floodplains, flora, fauna, etc.)			X		
13. CULTURAL RESOURCES (Native American burial sites, archaeological, historical, etc.)			X		
14. GEOLOGY AND SOILS (Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)			X		
15. SOCIOECONOMIC (Employment/population projections, school and local fiscal impacts, etc.)			X		
16. OTHER (Potential impacts not addressed above.)			X		
<b>SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION</b>					
17.	PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION (CATEX) # _____; OR				
X	PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.				
18. REMARKS THIS PROJECT DOES NOT QUALIFY FOR A CATEX; AN EA MUST BE DONE AND FUNDED BY THE PROJECT. 8. THIS WILL BE ANOTHER SOURCE OF AIR EMISSIONS. 11. THERE ARE TWO IIR SITES NEAR THE PROJECT SITE. <del>ADDITIONAL</del> SWMU 72 THEREFORE JP-8 FUEL CONTAMINATED SOIL MAY BE ENCOUNTERED. <b>ARE NUMEROUS</b> <b>AND OTHERS.</b> <b>AND GROUNDWATER PRESENT AT SITE.</b>					
19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION (Name and Grade) HAROLD DEESE, P.E. GS-11 ENVIRONMENTAL ENGINEER		19a. SIGNATURE <b>Harold Deese, P.E.</b> HAROLD DEESE, P.E.		19b. DATE 28 MAY 02	

1. COMPONENT DLA/DESC	<b>FY 2007 MILITARY CONSTRUCTION PROJECT DATA</b>	2. DATE 13 MAY 02
3. INSTALLATION AND LOCATION CHARLESTON AIR FORCE BASE, SOUTH CAROLINA		
4. PROJECT TITLE CONSTRUCT TWO 80 MBEL BULK FUEL TANKS		5. PROJECT NUMBER DKFX07-1007

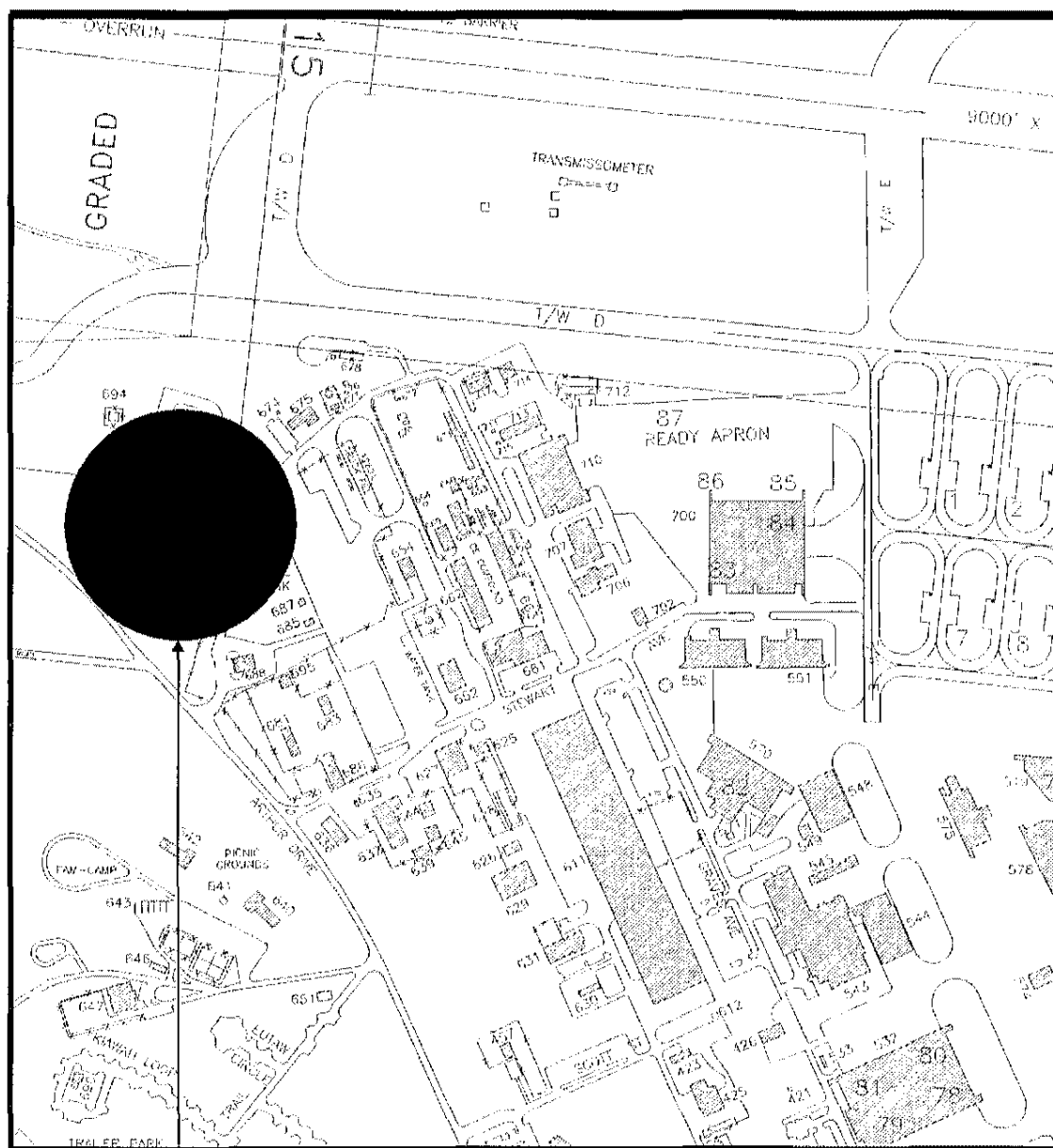


New Bulk Storage Tank

**SITE PLAN**

Not To Scale

1. COMPONENT DLA/DESC	<b>FY 2007 MILITARY CONSTRUCTION PROJECT DATA</b>	2. DATE 13 MAY 02
3. INSTALLATION AND LOCATION CHARLESTON AIR FORCE BASE, SOUTH CAROLINA		
4. PROJECT TITLE CONSTRUCT TWO 80 MBBL BULK FUEL TANKS		5. PROJECT NUMBER DKFX07-1007

**SITE PLAN**

Not To Scale

## **Appendix B**

### **Spill Containment Sizing Tables**

## APPENDIX B--SPILL CONTAINMENT SIZING TABLES

TABLE B-1

Containment Requirements

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Tank Capacity (barrels)	Tank Capacity (gallons)	Tank Capacity (cubic feet)	Tank Height (feet)	Tank Surface Area (square feet)	Tank Radius (feet)	Containment required (cubic feet)
80,000.00	3,360,000.00	449,197.9	48	9,358.3	54.5	494117.6 <sup>a</sup>
54,760.0	2,300,004.00	307,487.2	45	6,833.0	46.6	338235.9

<sup>a</sup> 110% largest tank

## APPENDIX B--SPILL CONTAINMENT SIZING TABLES

TABLE B-2

Estimated Spill Containment Area

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Volume (ft <sup>3</sup> )	Height (ft)	Surface Area (ft <sup>2</sup> ) <sup>a</sup>
494,200	4	123,529
494,200	5	98,823
494,200	6	82,353
494,200	7	70,588
494,200	8	61,765

<sup>a</sup> assumes 2:1 slopes for berms

## APPENDIX B--SPILL CONTAINMENT SIZING TABLES

TABLE B-3

Individual Tank Volume Dimensions for Rectangular Tanks

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

Berm Height	Dimensions w/o berms (ft)		Dimensions including berms (ft) <sup>a</sup>	
	Length	Width	Length	Width
Height 4'	823.5	150	839.7	166
	617.6	200	633.8	216
	494.1	250	510.2	266
	411.8	300	427.8	316
Height 5'	658.8	150	674.9	166
	494.1	200	510.2	216
	395.3	250	411.4	266
	329.4	300	345.5	316
Height 6'	549.0	150	565.1	166
	411.8	200	427.8	216

**APPENDIX B--SPILL CONTAINMENT SIZING TABLES****TABLE B-3**

Individual Tank Volume Dimensions for Rectangular Tanks

*Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina*

<b>Berm Height</b>	<b>Dimensions w/o berms (ft)</b>		<b>Dimensions including berms (ft)<sup>a</sup></b>	
	<b>Length</b>	<b>Width</b>	<b>Length</b>	<b>Width</b>
Height 7'	329.4	250	345.5	266
	470.6	150	486.7	166
	352.9	200	369.0	216
	282.4	250	298.4	266
Height 8'	411.8	150	427.8	166
	308.8	200	324.9	216
	274.5	225	290.6	241

<sup>a</sup> assumes 2:1 slope for berms

## **Appendix C**

### **Sensitive Species Potentially Occurring in Charleston County**

TABLE C-1

Sensitive Species Potentially Occurring in Charleston County

Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina

Scientific Name	Common Name	Global Rank	State Rank	Legal Status
<b>Plants</b>				
<i>Agrimonia incisa</i>	Incised Groovebur	G3	S1	NC
<i>Amaranthus pumilus</i>	Seabeach Amaranth	G2	S1	FT/ST
<i>Amphicarpum muehlenbergianum</i>	Blue Maiden-Cane	G4	S?	SC
<i>Anthraenantia rufa</i>	Purple Silkyscale	G5	S?	SC
<i>Asclepias pedicellata</i>	Savannah Milkweed	G4	S1	RC
<i>Botrychium lunarioides</i>	Winter Grape-Fern	G4?	S?	SC
<i>Calopogon barbatus</i>	Bearded Grass-Pink	G4?	S?	SC
<i>Canna flaccida</i>	Bandana-Of-The-Everglades	G4?	S4	SC
<i>Carex decomposita</i>	Cypress-Knee Sedge	G3	S?	SC
<i>Chasmanthium nitidum</i>	Shiny Spikegrass	G3	S?	SC
<i>Coreopsis gladiata</i>	Southeastern Tickseed	G3G5	S?	SC
<i>Cyperus tetragonus</i>	Piedmont Flatsedge	G4?	S1	SC
<i>Dionaea muscipula</i>	Venus' Fly-Trap	G3	S1	RC
<i>Eleocharis tricostata</i>	Three-Angle Spikerush	G4	SR	SC
<i>Eleocharis vivipara</i>	Viviparous Spike-Rush	G5	S?	SC
<i>Eryngium aquaticum var ravenelii</i>	Marsh Eryngo	G4T2T4Q	S?	SC
<i>Eupatorium fistulosum</i>	Hollow Joe-Pye Weed	G5?	S?	SC
<i>Forestiera godfreyi</i>	Godfrey's Privet	G2	S?	SC
<i>Galactia elliptica</i>	Elliott's Milkpea	G5	SR	SC
<i>Helenium pinnatifidum</i>	Southeastern Sneezeweed	G4	S?	SC
<i>Hypericum nitidum</i>	Carolina St. John's-Wort	G4	S?	SC
<i>Ipomoea macrorhiza</i>	Large-Stem Morning-Glory	G3G5	S1?	SC
<i>Ipomoea stolonifera</i>	Beach Morning-Glory	G5?	S?	SC
<i>Iris hexagona</i>	Walter's Iris	G4G5	S?	SC
<i>Lepuropetalon spathulatum</i>	Southern Lepuropetalon	G4G5	S?	SC
<i>Listera australis</i>	Southern Twayblade	G4	S?	SC
<i>Litsea aestivalis</i>	Pondspice	G3	S3	SC
<i>Lobelia boykinii</i>	Boykin's Lobelia	G2G3	S?	SC
<i>Ludwigia lanceolata</i>	Lance-Leaf Seedbox	G3	SR	SC
<i>Lysimachia hybrida</i>	Lance-Leaf Loosestrife	G5	S1	SC
<i>Monotropsis odorata</i>	Sweet Pinesap	G3	S1	RC
<i>Muhlenbergia filipes</i>	Bentgrass; Hairgrass	G?Q	S?	SC
<i>Orobanche uniflora</i>	One-Flowered Broomrape	G5	S?	SC
<i>Oxypolis canbyi</i>	Canby's Dropwort	G2	S1	FE/SE
<i>Paspalum bifidum</i>	Bead-Grass	G5	S?	SC
<i>Peltandra sagittifolia</i>	Spoon-Flower	G3G4	S?	SC
<i>Physostegia leptophylla</i>	Slender-Leaved Dragon-Head	G4?	S?	SC
<i>Pieris phillyreifolia</i>	Climbing Fetter-Bush	G3	S?	SC
<i>Plantago sparsiflora</i>	Pineland Plantain	G3	S?	SC
<i>Platanthera integra</i>	Yellow Fringeless Orchid	G3G4	S2	SC
<i>Psilotum nudum</i>	Whisk Fern	G5	S1S2	SC
<i>Pteroglossaspis ecristata</i>	Crestless Plume Orchid	G2	S2	SC
<i>Quercus austrina</i>	Bluff Oak	G5	S?	SC
<i>Rhexia aristosa</i>	Awned Meadowbeauty	G3	S2	SC
<i>Rhynchospora brevifolia</i>	Short-Bristle Baldrush	G3G4	S?	SC

**TABLE C-1**

Sensitive Species Potentially Occurring in Charleston County

Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina

Scientific Name	Common Name	Global Rank	State Rank	Legal Status
<i>Rhynchospora careyana</i>	Horned Beakrush	G4?Q	SR	SC
<i>Rhynchospora globularis</i> var <i>pinetorum</i>	Beakrush	G5?T3?	S?	SC
<i>Rhynchospora harperi</i>	Harper Beakrush	G4?	S?	SC
<i>Rhynchospora inundata</i>	Drowned Hornedrush	G3G4	S?	SC
<i>Sageretia minutiflora</i>	Tiny-Leaved Buckthorn	G4	S2	SC
<i>Sarracenia rubra</i>	Sweet Pitcher-Plant	G3	S1	SC
<i>Schwalbea americana</i>	Chaffseed	G2	S2	FE/SE
<i>Scleria baldwinii</i>	Baldwin Nutrush	G4	S1S2	SC
<i>Spiranthes laciniata</i>	Lace-Lip Ladies'-Tresses	G4G5	S1	SC
<i>Tridens carolinianus</i>	Carolina Fluff Grass	G3	S?	SC
<i>Tridens chapmanii</i>	Chapman's Redtop	G?	S?	SC
<i>Triphora trianthophora</i>	Nodding Pogonia	G3G4	S2	SC
<b>Animals</b>				
<b>Fish</b>				
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	G3	S3	FE/SE
<b>Amphibians</b>				
<i>Acris crepitans crepitans</i>	Northern Cricket Frog	G5T5	S5	SC
<i>Ambystoma cingulatum</i>	Flatwoods Salamander	G2G3	S1	FT/SE
<i>Ambystoma tigrinum tigrinum</i>	Eastern Tiger Salamander	G5T5	S2S3	SC
<i>Pseudobranchius striatus</i>	Dwarf Siren	G5	S2	ST
<i>Rana capito</i>	Gopher Frog	G3	S1	SE
<b>Reptiles</b>				
<i>Caretta caretta</i>	Loggerhead	G3	S3	FT/ST
<i>Clemmys guttata</i>	Spotted Turtle	G5	S5	ST
<i>Crotalus horridus</i>	Timber Rattlesnake	G4	S?	SC
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S?	SC
<i>Micrurus fulvius</i>	Eastern Coral Snake	G5	S2	SC
<i>Ophisaurus compressus</i>	Island Glass Lizard	G3G4	S1S2	SC
<i>Seminatrix pygaea</i>	Black Swamp Snake	G5	S?	SC
<b>Birds</b>				
<i>Accipiter cooperii</i>	Cooper's Hawk	G5	S?	SC
<i>Aimophila aestivalis</i>	Bachman's Sparrow	G3	S3	SC
<i>Charadrius wilsonia</i>	Wilson's Plover	G5	S3?	ST
<i>Dendroica virens</i>	Black-Throated Green Warbler	G5	S4	SC
<i>Elanoides forficatus</i>	American Swallow-Tailed Kite	G5	S2	SE
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G4	S2	FT/SE
<i>Ictinia mississippiensis</i>	Mississippi Kite	G5	S4	SC
<i>Limnothlypis swainsonii</i>	Swainson's Warbler	G4	S4	SC
<i>Melanerpes erythrocephalus</i>	Red-Headed Woodpecker	G5	S?	SC
<i>Mycteria americana</i>	Wood Stork	G4	S1S2	FE/SE
<i>Pelecanus occidentalis</i>	Brown Pelican	G4	S1S2	SC
<i>Picoides borealis</i>	Red-Cockaded Woodpecker	G3	S2	FE/SE
<i>Plegadis falcinellus</i>	Glossy Ibis	G5	S?	SC
<i>Sterna antillarum</i>	Least Tern	G4	S3	ST
<i>Tyto alba</i>	Barn-Owl	G5	S4	SC
<b>Mammals</b>				

**TABLE C-1**

Sensitive Species Potentially Occurring in Charleston County

Fuel Storage Tank Removal and Replacement Environmental Assessment, Charleston Air Force Base, South Carolina

Scientific Name	Common Name	Global Rank	State Rank	Legal Status
<i>Condylura cristata</i>	Star-Nosed Mole	G5	S3?	SC
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-Eared Bat	G3G4	S2?	SE
<i>Lasiurus cinereus</i>	Hoary Bat	G5	S?	SC
<i>Microtus pennsylvanicus</i>	Meadow Vole	G5	S?	SC
<i>Myotis austroriparius</i>	Southeastern Myotis	G3G4	S1	SC
<i>Neotoma floridana</i>	Eastern Woodrat	G5	S3S4	SC
<i>Neotoma floridana floridana</i>	Eastern Woodrat	G5T5	S3S4	SC
<i>Phoca vitulina</i>	Harbor Seal	G5	SA	SC
<i>Sciurus niger</i>	Eastern Fox Squirrel	G5	S4	SC
<i>Ursus americanus</i>	Black Bear	G5	S3?	SC
<b>Other</b>				
	Carolina Bay Community	G?	S?	SC
	Colonial Waterbirds	G?	S?	SC

Source: South Carolina Department of Natural Resources, Accessed 8/03/04

[http://www.dnr.state.sc.us/pls/heritage/county\\_species.list?pcounty=charleston](http://www.dnr.state.sc.us/pls/heritage/county_species.list?pcounty=charleston)

G1 indicates a species that is Critically Imperiled in the world — At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

G2 indicates a species that is Imperiled in the world — At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

G3 indicates a species that is Vulnerable in the world — At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

G4 indicates a species that is Apparently Secure in the world — Uncommon but not rare; some cause for long-term concern due to declines or other factors.

G5 indicates a species that is Secure in the world — Common; widespread and abundant.

G? indicates an Inexact Numeric Rank—Denotes inexact numeric rank.

G#G# indicates a range of uncertainty in the status of a species or community. Ranges cannot skip more than one rank.

G#T# indicates the global rarity of a species (G#) and the indicated subspecies or variety (T#).

S1 indicates the same rarity as G1, but is limited to within the boundaries of South Carolina.

S2 indicates the same rarity as G2, but is limited to within the boundaries of South Carolina.

S3 indicates the same rarity as G3, but is limited to within the boundaries of South Carolina.

S4 indicates the same rarity as G4, but is limited to within the boundaries of South Carolina.

S5 indicates the same rarity as G5, but is limited to within the boundaries of South Carolina.

S? indicates that there is insufficient data to determine the species abundance within South Carolina.

S#S# indicates a range of uncertainty in the status of a species or community.

FE indicates a species that is listed as endangered by the U.S. Fish and Wildlife Service.

FT indicates a species that is listed as threatened by the U.S. Fish and Wildlife Service.

SC indicates a species that is listed as "of concern" by the State of South Carolina.

SE indicates a species that is listed as endangered by the State of South Carolina.

ST indicates a species that is listed as threatened by the State of South Carolina.

## **Appendix D**

### **Comment and Response Matrix**

**Comment and Response Matrix**  
CHS Storage Tanks EA

Office Symbol	Comment Category*	Section (page, sec, para, line)	Comment	Rationale	Response
HQ AMC/A7VQ	A	General	Please paginate all pages, including figures.	Improves ability to reference specific pages.	Page numbers were added to figures.
HQ AMC/A7VQ	A	General	Remove preparer's logo from figures.	Recommend adherence to AF protocol for environmental documents, as appropriate.	Logo was removed from figures.
HQ AMC/A7VR & HQ AMC/A7VQ	S	2-4, 2.6, table 2-1	Add impact on/from Environmental Restoration Program sites, which technically includes both Environmental Restoration Account (ERA)- and non-ERA-eligible sites.	Inclusion of review of this category is required, and is present within the actual text.	Table was modified.
HQ AMC/A7VQ	A	Fig 2-1	Add a location diagram to this figure similar to that present on figure 2-4.	Ease the ability to locate position of the mapped area within the base.	Location diagram was added.
HQ AMC/A7VQ	S	3-3, 3.4.2.1	It is not apparent from this discussion that sites not eligible for ERA funds were considered. All open SWMUs, not just those that are ERA-eligible, as well as contaminated locations that are not SWMUs, need to be considered. The IRP includes only ERA-eligible sites.	The potential impact(s) to and from contaminated locations is not affected by the source of cleanup funds. All need to be equally considered.	The Hazardous Waste section was re-written to refer to hazardous waste sites generically as part of the overall Air Force hazardous materials program.
HQ AMC/A7VQ	S	3-3, 3.4.2.1, para 1	Include the rationale for discussion of the two specific sites within this paragraph.	Clarifies that they are (apparently) the only sites potentially impacting, or impacted by, the proposed action.	The following text was added: There are two ERP or other hazardous materials sites at or near the location of the Proposed Action. There are no ERP or other hazardous waste sites at the Third Alternative location (Figure 3-3)
HQ AMC/A7VQ	S	3-3, 3.4.2.1, AOC O	Please update the discussion on AOC O here and throughout the document. A no further action decision document was submitted to the state, but before DHEC could respond, another fuel spill occurred. Note that since this is an active fuel area it will not be addressed as a "site", per se; spills will be addressed if and when they occur.	Ensure the discussion is complete and up to date, to include the analytical data.	Based on discussions with Air Force personnel this comment was not included. The hazardous waste sites are refereed to in a general manner. No specific management language was included.
HQ AMC/A7VQ	A	3-4, para 1	Move the last sentence to within the initial discussion for this section.	The sentence is general in nature and has nothing to do with AOC O.	The sentence has been moved.
HQ AMC/A7VQ	A	3-8, 3.6, line 1	Correct extra space between "and" and "around"	Clerical	This correction was made.
HQ AMC/A7VQ	S	3-8, 3.6.1.1, 1, 4	Add sentence: "Undeveloped land accounts for approximately 650 acres or more than 1/10th of the base land area."	Correct an understatement.	The sentence was added.

**Comment and Response Matrix**  
CHS Storage Tanks EA

Office Symbol	Comment Category*	Section (page, sec, para, line)	Comment	Rationale	Response
HQ AMC/A7VQ	S	3-8, 3.6.1.1, 2, 4-5	Change the last sentence to read: "Typical cover on semi-improved land includes common Bermuda, centipede, rye, and St. Augustine grasses."	Clarity	The sentence was changed to incorporate the text.
HQ AMC/A7VQ	S	3-9, 3.6.2, 3, 9	Add: " <i>Passerina ciris</i> " after "painted bunting".	Consistency	The scientific name was previously mentioned in Table 2-1 at the first occurrence.
HQ AMC/A7VQ	S	3-9, 3.6.2, 3, 12	Ensure the CHTE1 painted bunting habitat area is discussed appropriately and consistently within the document. Table 2-1 indicates possible loss of habitat and the maps are not adequate to specifically determine the proposed location for the Third Alternative.	A loss of up to 2.27 acres of painted bunting habitat appears possible from the information in other parts of the document.	The third location has been more clearly marked on the figure showing the CHTE sites.
HQ AMC/A7VQ	A	Figs 3-2 & 3-3	These two figures are fuzzy and difficult to read. Unlike most in the document, they also do not efficiently fill available page space. The overall poor quality makes it difficult to interpret the map symbols, which appear different from those shown in these figures' map legends. Define "SCSP" and add to the list of acronyms.	Adequacy of figures to depict subject.	The figures have been re-worked to increase size and clarity.
HQ AMC/A7VQ	A	Figs 3-4 & 3-5	Outline the area of each alternative on analogous figures throughout the document.	Ease ability to determine the area of potential impact. The current arrow appears to point to a specific, tiny, site.	Outlines or symbols of the two action alternatives were added to the figures as appropriate.
HQ AMC/A7VQ	S	4-3, 4.4.1.2	Include discussion of the potential impacts of the project to remediation of the site.	Full analysis requires impacts both to and from the site.	Based on discussions with Air Force personnel this comment was not included. The hazardous waste sites are referred to in a general manner. No specific management language was included.
HQ AMC/A7VQ	S	4-5, 4.5.2.1, 1, 8	Delete sentence: "Because of its low quality, any accidental impacts could easily be mitigated." and replace with: "Any impacts to these wetlands, regardless of quality, would be covered by an approved wetland permit in accordance with Section 404 of the CWA. The design of this project seeks first to avoid any impact to wetlands and only as necessary, to minimize adverse impacts to wetlands associated with this project."	Text refers to wetland resources with a negative connotation "Because of its low quality". Regardless of its quality, impacts to "Waters of the US" none-the-less require permits, if impacted.	Section 4.5.2 has been revised to reflect the fact that no wetlands will be impacted under any of the alternatives.

**Comment and Response Matrix**  
CHS Storage Tanks EA

Office Symbol	Comment Category*	Section (page, sec, para, line)	Comment	Rationale	Response
HQ AMC/A7VQ	M	4-9, 4.11.1, 1, 2-3	Add "as applicable" after ""procedures".	It is very important that we not impose Air Force standards and procedures on contractors - to do so would cause the Air Force to incur liability under OSHA for the safety of contractors.	Suggested text was added.
HQ AMC/A7VQ	S	4-12, 4.13.5, 2, 3	After sentence ending in "low.", add: , however, an unavoidable loss of up to 2.27 acres of potential painted bunting habitat would likely occur", or appropriate language in accordance with the comment on section 3.6.2 above.	Consistency and accuracy.	The text has been modified to indicate that no wetlands would be lost.
HQ AMC/A7VQ	S	6-1, 6.0	The subject list is not provided within the document.	Though understood the (internal) draft was not distributed outside the Air Force, this section states it includes a list of agencies and persons consulted. Ensure clear differentiation between persons consulted and those to which it is intended copies will be provided. Frequently, there is a section within chapter 1 regarding persons consulted (analogous to section 1.5) and this section is reserved for the (intended) official draft distribution list.	The list will be included in the final version of the document.
HQ AMC/A7VQ	S	7-1, 7.0	There is no indication in this list, or within the document itself, that personnel at Charleston AFB were consulted during the preparation of this document.	Accuracy and completeness.	Charleston AFB contacts were listed in Section 7.
HQ AMC/A7VQ	A	7-1, 7.0, USAF, 1998.	Include the contractor who prepared the subject document within the reference citation.	Completeness and accuracy.	URS-Radian was added to the references.

\* Categories are: Critical, Major, Substantive, Administrative